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## NEWS IN BRIEF

## Racal set to buy Decco

UNLESS a counter-offer is made Racal will take over Decco in a share exchange with no cash alternative. Agreement has been reached between the Racal and Decco boards on terms which value Decco at about £85 million. This is just below asset value, and the terms are widely regarded as favourable to Racal. They are five Racal shares for every three Decco ordinary shares, and three Racal shares for every two of the non-voting "A" shares.

Racal and Decco together should make over £100 million profits on sales of £1500 million in the 1981-82 financial year.

## European link

IN its first European joint venture, Californian minicomputer General Automation is teaming up with Matra of France. The companies will invest \$6 million in a factory in Nantes to make high technology laminates for use in the manufacture of multi-layer printed circuit boards for the European computer industry.

## Price cuts

STORAGE Technology has cut the prices of its IBM compatible semiconductor memory systems worldwide by up to 40%. One megabyte in the UK now costs between £17,000 and £28,000 depending on the existing memory size.

## Harris' new series

HARRIS Computer Systems has introduced a family of machines called the Series 400 which provide twice the power of the previous top-end Harris computer, the S500.

## Xerox buys maker of reading machine for blind

XEROX has bought the whole of Kurzweil Computer Products, maker of the reading machine for the blind and other products for the disabled and an all-fount OCR machine for data entry (CW, August 23, 1979).

The small Cambridge, Massachusetts firm has been incorporated into Xerox's Information Products Group at a price of \$3.8 million, with an extra sum of up to \$6 million to be paid in 1982, according to Kurzweil's earnings.

Founder Raymond Kurzweil, who received an award from the Association for Computing Machinery for his work, will stay on as president. He pointed out that Xerox's backing would permit the firm's research activities to be expanded.

Xerox's John Tisworth, president of the Information Products Group, said that the Kurzweil technology would be helpful in developing the office systems of the future. Turnkey Systems of Amersham will prob-

ably continue to market Kurzweil's range in the UK for at least two years. Before the takeover Xerox had a 15% stake in Kurzweil. An OCR bureau using the Kurzweil Data Entry Machine has been set up in Dunstable by Ensign Graphics. Virtually any font, whether printed or typed, can be read by the machine and transferred to a customer's tape, but because it is slower than conventional equipment it is considerably more expensive.

## GAP profits back on course

AFTER a disastrous year in April 1979 in which pre-tax profits slumped to £13,000 from \$1 million a year earlier, software house CAP-CPP appears to be back on course. The company reports that profits look like being back around the £1 million mark this year.

The poor showing in 1978-79 on a turnover of £11 million was attributed to loss of the marketing licence for ADR software products in Europe, a gap now being filled by CAP's own multi-frame software products; to lower demand for professional services; and heavy investment in MicroCobol and other micro-processor products.

There are now over 15 licensed distributors of MicroCobol worldwide, and between them they are now investing more in MicroCobol applications, training and marketing than CAP itself.

## GA 'not in difficulties'

SAYING that "a certain view in the Press" (not *Computer Weekly*) had spurred numerous inquiries from customers, General Automation has issued a statement emphasising that it has no financial difficulties. While, it says, it is responding to acquisition and merger overtures from other companies as in the interests of its shareholders, it is obliged to disclose its financial position and supporting its present growth and remaining independent.

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## Briefing \$200,000 Byte Shop loan

A \$200,000 LOAN from the Charterhouse Group has been granted to Comart for re-launching The Byte Shop 1980, its retail microcomputer chain bought by Comart two weeks ago. The loan, according to a joint statement, reflects Charterhouse's confidence in the new management of the company.

## IBM discounts

HAVING tried offering quantity discounts on the Series 1 minicomputer, IBM finds that it is still, and in the US has introduced a new, more attractive discount structure. Where 0 year ago, the company dipped a toe in the water with 5% discounts on sales of \$1 to \$9, rising to 15% on \$10 or more, it has now lowered the 5% band to order for 20 or more, rising to 10% on 50 or more to 15% for 100 or more.

## Plessey moves

THE semiconductor, optoelectronics and microwave divisions of Plessey have been reorganised into a single operating division by the company. To be headed by Dr Melvin Larkin, who joined the company from Motorola UK, the new division already has annual sales of £22 million.

## Burrage B6900

CONTINUING the modernisation of its computer line, Burrage has added a B6900 series of medium-to-large mainframes in the US. They come in single and dual processor configurations and are claimed to be 30% faster, take up 30% less space and 25% less power than their B6000 predecessors. The bottom machine is claimed to match the IBM 3031.

## Memory for 303X

CAMBRIDGE Memories of Waltham, Massachusetts, has introduced an add-in memory for IBM 303X systems called the 303X/2000. Its most notable feature is the use of 64K-bit chips. Fujitsu whose product is non-standard.

## Harris first

MINI manufacturer Harris Computer Systems claims to be the first computer supplier to use for its Fortran-77 compiler. The product is a two-pass compiler using less than 86K-bytes.

## Prize crossword

Prizes including £20 are to be won in the second of our prize crossword competitions. See page 52 for this month's crossword.

## COMPUTER WEEKLY

Number 692 Thursday, February 7, 1980 Price 20p

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## Currys' strategy for micro battle

THE techniques of merchandising learned in the high street battles for sales of televisions and washing machines are to be the weapons used by Currys in its assault on the microcomputer systems retailing business. This was the outline of the company's strategy given last week at the Microsystems 80 conference and exhibition by Derek Moon, managing director of Currys new Microsystems division.

A full merchandising package, including leasing, finance, installation on customer site, and maintenance will be operated by the company, he said, and it will provide all

aspects of hardware and software support. "Nothing will be sold without being tested," he added.

He attacked the existing manufacturers, distributors and dealers during his presentation, for the way they have developed the market so far. They were under-capitalised and fragmented, under-supplying in some areas, and over-supplying in others, he said.

He highlighted four main market sectors for the industry, broken down by price. The first two, for education, home and small business applications, covered price ranges of up to £750 and up to £2,000. Here Com-

modora, Tandy and Apple predominated.

The second pair, covering education and small business areas, have price breaks at £4,000 and £7,000. Here, he predicts considerable penetration by the Japanese.

Though unconfirmed, industry sources suggest that Currys will be selling Japanese Sord and Panasonic hardware, with CAP's MicroCobol applications software.

Moon said that software would be bought, packaged, from outside suppliers initially, but the company is recruiting programmers, and would also work with other software houses.

## Step into 'cashless society'

BARCLAYS Bank is planning an experiment in electronic funds transfer for Norwich area petrol stations later this year, enabling motorists to make direct debits by magnetic stripe card to their Barclaycard or current accounts.

Meanwhile a new microprocessor controlled cash card which is thrown away once all the money on it is used up is being considered by the Post Office and London Transport.

Oil companies are being asked to collaborate in the Norwich area experiment, but planning is still at an early stage, and the card-rending equipment to be attached to the pumps has not yet been selected. At present, the plan is for holders of both Barclaycards and Barclaybank cards to be offered the new service.

There are about five million Barclaycard holders and all new cards have a magnetic stripe on the back. This enables holders to withdraw cash from the Barclaycard accounts through cash dispensers and automatic teller terminals (CW, October 25, 1979).

There are currently 131 terminals installed outside Barclays branches, and the target is 200 by the middle of the year. Some 900,000 cards have been issued to Barclays customers. The micro-controlled cash card, developed in Italy by SGS-ATES, is a fixed value "electronic" credit card that is thrown away when all credit units are used up.

Developed in conjunction with the Italian telephone supplier, SIP, the possible applications of the Xcard, as it is called, are being explored.

Turn to back page

## INSIDE THIS WEEK'S CW...

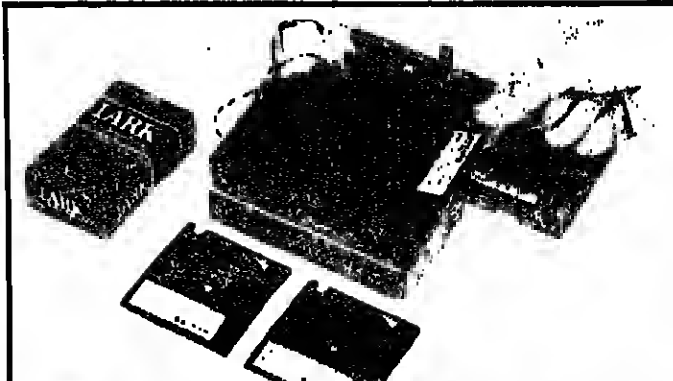
## NEW SERIES STARTS

The popularity of our earlier series on file design has prompted the author, Owen Henson, to compile a series on advanced file design. It starts this week. Page 22

## WHAT A LOT WE GOT

Areas where industries like steel and shipbuilding have been run down are fighting back, offering financial and social benefits to attract new industries. We look at some of the ways in which they have done this. In a special supplement. Pages 22-28

Computerworld on the starting page two



About one-fifth the size of a standard mini-floppy disc drive the FMC-100 drive shown here is described by its Japanese manufacturer, Sanjyo Seiki, as a disc type magnetic card reader. Available in the UK from Roxburgh Electronics of Rye, East Sussex, the FMC-100 is designed to interface with 8-bit microcomputers and could be used as a program loader. The main difference between the FMC-100 and a bigger floppy disc drive is that the FMC only records data on one track.

## Logica stays away from Insac Products board

LOGICA has decided not to appoint a new representative to the board of Insac Products following the resignation from the board of Logica managing director, Len Taylor, in December (CW, December 13, 1979).

The decision was made at a meeting of the Logica Holdings board last Friday. But Logica said that it hoped to continue a "liaison" with Insac Products and Len Taylor himself pointed out that Logica could be interested in the long-term funding of a project by Insac Products.

On whether Logica was still technically a member of Insac Products, Taylor echoed a Logica request for a clear definition of membership.

A Logica statement emphasised that it was not seeking any change in NEB's shareholding.

## IBM price rises hit UK users

IBM in the UK finally followed its US parent with widespread and sweeping price increases last week — and for people renting or leasing their hardware from DP Division, the increase is even greater than in the US, 9% across the board compared with 7% in the US (CW, January 3). In France, rentals and leases also go up 8%, but in Germany, where the inflation rate is much lower, they go up only 5%.

Despite the UK inflation rate users feel that, given the strength of sterling against the dollar, IBM is giving its users a rough deal.

"I can accept the increases in people costs like maintenance charges, but some of the others seem unreasonable in the circumstances," commented Des Lee, chairman of the IBM Computer Users' Association.

He thought the rise in rentals would make IBM's Sale of Installed Option, where users can buy outright hardware they have had on rental for at least 18 months, was now particularly attractive option.

He said that users could save up to 50% over two years by buying equipment on this basis and then doing a sale and leaseback deal with a leasing company.

The maintenance increases are 20% on contracts, or increases per call of between £14 and £8.80 per hour for customer engineer visits. The lowest rise applies to CPUs, line printers, tape and disc drives, and the highest to terminals, matrix printers and electro-mechanical hardware.

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1979-80







## Downtime

by Chad

## Perfidious Albion

THE marauding British are on the rampage, according to US stock analysts. One of their number, Clark Winslow, is being prosecuted by the US Securities and Exchange Commission for allegedly trying to get Fairchild Camera and Instrument to pay him in return for tipping them off about a proposed takeover.

This was before Fairchild was bought by Schlumberger, and several firms were eyeing the component manufacturer hungrily. Winslow is alleged to have rung up Fairchild and told executives there that a giant British electrical pro-

ducts maker was all ready to pounce. The Fairchild men would not like that, Winslow told them.

Why not? they replied. Because the British firm's history of acquiring companies included "purging management and operating the company in a way that would result in dismemberment of the structure of the organisation," Winslow confided.

Now what company do you suppose he could have meant? I am sure that any suggestion that such things go on in a company he is associated with would make Geoff very cross.



The coach in my picture made an attempt to protect him from the rain and spray, but why doesn't the machine?

## Olympics row

HOPING against hope that the Olympics will actually take place somewhere or other, the British National Olympic Rowing Squad is busily bringing new technology into its coaching.

Strain gauges are attached to the oars and goniometers to the rowlocks and the information thus collected is transmitted by radio to the shore to be plotted out on an oscillograph.

From this the coach works out how fast the boat should be going (as opposed to how fast it is actually going). They would really like to be able to do computer analysis, but are waiting for someone to give them a computer.

I have a better idea. Why not have a microprocessor-controlled oarsman? It would save getting all cold, wet and exhausted, wouldn't it?

## MICHIE'S PRIVATEVIEW

## Urgently wanted: soft automation

ADVANCED automation offers salvation to British industry. But in addition to feared social dislocation, a serious problem has yet to be addressed: the possibility of disastrous mismatch between human and machine problem solvers. Consequent drawback of machine decision-taking in medical diagnosis, factory automation and air-traffic control are becoming evident.

The recent inquiry into the Three Mile Island incident brought to light a particularly disturbing case in point. Once malfunction began, the operators were flooded with distracting and bewildering output from the control computer, which made it virtually impossible for them to work out what was going on.

The remedy lies in "soft automation". Automated systems must be forced at the design stage into the human mental mould. Concepts such as strategies, goals, constraints, advice are familiar mental currency for people. These must also drive machine processes, and thus render them transparent to human users and monitoring staff.

Laboratory approximations to this design ideal have been obtained. Incorporation of the "humanising" design principle could enable British automation technology to lead the world in sophistication and safety.

Somewhere between two ex-

treme forms encountered in conventional automation (algorithmic at one pole, database-like at the other) lies a "human window". But computer programs for complex tasks are typically so structured as to lie outside the window.

Devices driven by such programs present an inscrutable face to the user, and represent a potential social hazard. One investigation is the factory shop floor.

Practical benefit as well as scientific interest might accrue from trying for an ambitious goal which would knit a variety of independently functional modules together, constructing in effect an integrated Cognitive System.

Some people experience unease at the idea of intelligent robots. They are seriously mistaken. Real dangers do exist, but they come from precisely the opposite direction, namely from the development of unintel-

ligent, but super-clever, automation devices. Commercial optimisation of the use of machine resources pushes designs increasingly towards systems whose behaviour is clever and accurate, but humonously fathomable. The hazard is intensified in highly complex problem-domains. If machine-optimality remains the design criterion, we are ultimately headed towards a technological black hole.

We do not yet know in the Three Mile Island case whether the system's garrulous and confusing behaviour could be cured simply by increased selectivity of messages, or whether a summarising capability would need to be incorporated. In the latter case the adoption of techniques of Artificial Intelligence would not be just a luxury but a life-and-death necessity.

Artificial Intelligence is that branch of information science which specifically studies the

human limits in the context of machine representations of knowledge — a, ways in which human knowledge and thought can be represented in computer memory so as to preserve their specifically human forms. When "human window" representations have been found, working conceptual bridges have been successfully built between machine problem-solvers and those employed to monitor and interrogate them. Intelligent problem-solvers of this kind are called "knowledge-based" or "expert" systems.

On the brain-oriented side of Artificial Intelligence lies Cognitive Science. On the machine-oriented side is a discipline: Knowledge Engineering. It is largely concerned with "expert systems". It is an expert system that has been incorporated in the Three Mile Island software, the course of events when malfunction began would certainly have been different.

In this country support for knowledge engineering is on a tiny scale. SRC's recent move into robotics is to be welcomed, but remains extremely tentative as regards the need for "knowledge-based" as opposed to "instruction-based" robots. Yet if Britain is to outstrip the Japanese in advanced automation, then we should concentrate where the Japanese are still weak, and where we, as computationally sophisticated and inventive nation, are potentially strong. We should concentrate on soft automation. We should foster the arts of knowledge engineering.

It is in this spirit that I read the warning contained in a recent paper put out from the Cabinet Office by the Advisory Council for Applied Research and Development that in Japan, the US and West Germany "... there is continuing research to produce 'more intelligent' second generation robots with sensory perception."

As any AI person will confirm, once you start seriously on machine perception, then machine learning, planning, self-explanation and related cognitive skills have to be tackled too.

Britain could be the first nation to develop intelligent software for industrial robots, so that users could teach by examples rather than having to program these devices. Technical industrial staff could also ask them, in cases of malfunction, what ails them, rather than thumbing helplessly through the maintenance manual.

released in about a month in the UK at about the same time that its distributorship agreement with another Japanese company, Omron, comes to an end. Anker has stressed that it will continue to support its Omron customer base.

Of the three models, Anker is pinning its hopes on the 37/850 which is based on the Intel 8085 and which is aimed at a wide range of markets including hotels, multiple stores, bars, and garages.

As standard it comes with 30 department sales totals, turnover breakdown by up to 20 sales staff totals and price look-up for 80 items. Price look-up can be expanded up to 300 items in increments of 80.

Optional equipment will include OCR wand and floppy disc or cassette storage.

Both the System 37 and 46 are basic machines and are compatible with the 37/850.

No prices are available at present, but a company spokesman said that they would be "competitive".

## Report compares GEC 4000 and PDP-11 ranges of minis

DETAILED descriptions of the GEC 4000 and Digital Equipment PDP-11 families of microcomputers are contained in a report from John Bell Technical Systems, a software and hardware house which has practical experience with both ranges.

The report contains separate sections devoted to system architecture, instruction sets, machine execution speeds, peripheral support, memory management, operating systems and multi-programming real time applications, manufacturer supplied software and languages. Each section is divided into three parts. The first two describe the relevant features of GEC and PDP-11 machines respectively, and the third part compares these features. The

bulk of the contents is in narrative rather than tabular form. Comparing instruction sets, for example, the report points out that the GEC set is the same for all 4000 models whereas the PDP-11 sets are divided into five groups not all of which are available on all machines in the range. The report concludes that portability of software between models should therefore be easier on the 4000 range than on the PDP-11. In the manufacturer software section the report says that there are generally more file utilities available on the PDP-11 than on the 4000.

A comparison of the GEC 4000 and PDP-11 ranges of microcomputers in a Real Time Environment, 224pp, £143 incl. VAT, John Bell Technical Systems Ltd, Clark House, 2-3 Albert Street, Fleet, Hants, Tel: Fleet (02514) 28014.

## Legal system starts pilot work this month

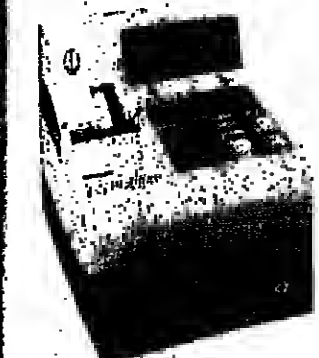
EUROLEX, the first UK-based legal information retrieval system, is to start pilot operations this month with a full commercial service working by late spring. The service will provide lawyers with online access to Common Market law reports, European treaties, current UK law reports, and reports on the law of intellectual property (CW, June 14, 1979).

About 20 million words of text will be online initially, occupying 100 megabytes of disc on BOC Data's IBM and Andahl mainframes. The database should have increased to 50 million words by the end of 1980 as other categories of European, UK, and Irish law are added.

## Anker to launch Japan built cash registers

FOR the first time, Anker Data Systems is to launch a range of electronic cash registers built in Japan to its own design.

Three models, the System 37, 37/850 and the System 46 will be



A System 37 cash register

## Plessey men on fraud charges

AS a result of a two-year investigation by the Merseyside fraud squad, two Plessey employees are to appear in court at the end of this month. The police are believed to be still looking for a third man.

The charges against the men have been made in connection with unspecified "irregularities" the company detected at its Edge Lane, Liverpool factory, which itself was under fire from local MP David Alton last year. Alton queried the industry Secretary, asking where millions of pounds of government funding to the factory was being directed.

## Sesa 'top in message switching'

FRENCH systems house Sesa is claiming to be No 1 European supplier of message switching systems following an agreement under which it will buy CIT-Alcatel's message switching business.

The message switching systems have been marketed in 19 countries by the CGE subsidiary, and the business has an annual turnover of FF 20 million, just over £2 million. Making use of CIT-Alcatel support facilities, Sesa plans to market the systems worldwide.



Norman Nunn-Price, Euralex database director, explains features of the system at the launch. Nunn-Price was formerly at Harwell where Status was developed, and headed the EEC study on legal retrieval.

## Laser printing of self-adhesive labels study by business suppliers

SELF-ADHESIVE label suppliers, Three Counties Business Supplies of Ledbury, Herefordshire, is one of a group of firms looking at ways for self-adhesive labels to be printed by high speed laser printers like the IBM 3800 and the Siemens machine sold by ICL.

Three Counties, otherwise known as 3C, points out that printing self-adhesive labels with a laser printer is difficult if not impossible at the moment because the heat generated by the laser beam destroys the adhesive. The labels peel off the backing paper and, as well as being rendered useless, they could damage the printer by jamming it.

According to 3C, manufacturers of adhesives are working on the development of heat proof alternatives to the adhesives currently used. The first label supplier to bring out a product that can run through a laser printer could make a killing.

Label printing is a suitable application for laser printers because multiple copies of labels are not often required. A different type of high speed printer, the Honeywell Page Printing System, appears to pose less serious problems because it employs an electrographic imaging process that works at more or less normal temperatures. But at the moment two problems need to be solved with the PPS. One is that the paper is turned through 180° during its passage through the printer which can cause some of the labels to peel off. The other problem is that the printing process includes running the paper through a dielectric toner bath which stains the labels at the edges.

But 3C does not regard the problems with high speed printers as desperate because a lot of label printing involves comparatively small volumes and will therefore continue to be handled by conventional mechanical printers.

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## 10 years ago

From Computer Weekly of February 5, 1970...  
WORK began on installing a dual Surugha 865000, worth £18 million, for the Metropolitan Police at Hendon 10 house criminal records... ICL won an order from the AA for a 1003A which the association would be using to produce a national survey on the causes of breakdowns... An inquiry into the UK computer industry was undertaken by a sub-committee of the Computers select committee on science and technology under the chairmanship of Alroy Neave.

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# PAGE SIX

for programmers  
and analysts

by Judith Morris

## 'As many ghastly programs written in PL/I as in Cobol'

LETTERS from as far afield as Holland have been pouring in from avid Cobol fans in response to the article by our guest writer Ian Clark, Cobol — a Time for Change (this page, January 3).

Most of their indignation seems to stem from the fact that Clark ignored many of the recent developments of Cobol, and according to J. P. Nonnicks of Shell Nederland in The Hague he described an IBM version of Cobol that has never been standardised and is already 15 years old.

J. R. Piggott, who is a member of the BCS Cobol specialist group, asks, "Did you wait ten years to publish Mr Clark's article or does it simply take that long for Cobol manuals, and PL/I manuals for that matter, to reach him in the Middle East?"

The chairman of the BCS Cobol specialist group, John Triance, scores clear of the debate about the merits of changing from Cobol to PL/I, the language chosen by Clark to illustrate many of his points in the article. He does, however, urge anyone who is considering such a change to base their decision on the version of Cobol which will be available when the conversion is finished, rather than an out-of-date version such

as the one described by Clark.

Triance points out that ANS 74 Cobol, which is now used by the majority of programmers, incorporates many of the requirements that Clark has for a better language, and says:

1. String handling is possible using the STRING and UNSTRING statements.
2. Data can be declared near the procedural code by using separate compiled programs.
3. A STRING can be searched for a given character or character string by means of the INSPECT statement.
4. The date can be obtained using the ACCEPT statement.
5. Selective monitoring and tracing can be achieved by use of declaratives placed at the start of the procedure division. Debugging lines placed throughout the program can also be activated by compile time and run time switches. READY TRACE and EXHIBIT have never been part of standard Cobol.

The next standard, scheduled for next year, is to include further features including the INITIALISE statement, which can be used to initialise Cobol arrays, END-IF which can be used as an alternative to the full stop for terminating IF state-

ments, and EVALUATE which is a form of the case statement.

Some readers, like D. Leigh of Stone in Staffordshire, only partially defended Cobol and, after pointing out the obvious errors, admitted that Clark had some good points. Others, such as J. Piggott, went to great pains to explain the advantages of Cobol.

"Proportionally," he says, "just as many ghastly programs are written in PL/I as in Cobol, or for that matter in any other language. Give a sloppy programmer a more concise language and he will simply cram more rubbish into each page of listing. A programmer with a careful and disciplined approach will write beautiful and elegant code in either PL/I or Cobol."

Leigh goes on to say that Cobol was designed for the business community, and because it uses words rather than symbols there is less of a technological barrier between the end user and the programmer.

"The average business user has little need for numerical analysis or relational calculus," he says. "He is more concerned with practical questions such as: Can programs be compiled and run on another machine? How easy is it to train and recruit programmers?"

Clark's argument about the relative power of the languages is very suspect," adds Leigh. "It ignores the fact that a line of code is only written once but read many times during its life, so speed of coding is not such an important factor."

Leigh stresses the point that PL/I, for all its advantages, is still fundamentally an algorithmic language. Therefore it is excellent for coding problems which are essentially logical ones, whereas business problems are more concerned with data than with algorithms.

So the debate over the power of the business language goes on. Most of our correspondence seems to be from those in complete support of Cobol. Is there anyone who isn't? Page Six will be pleased to hear your views.

**Puzzler**

ABJOVORK  
QCRADYE  
GHTILDUE

THIS brief note was sent recently to one of our secret agents. After a moment's reflection, he had no difficulty in reading it.

Can you spot the message? See page 81 for solution.

## Hope for machine code fans

TWO weeks ago I asked: Is there anyone out there who has made it in machine code? Well, apparently there is, looking at the mail we have had from people throughout the country who are of the same mind as Chris Blackmore, our correspondent who had found that no-one seemed to want to employ a machine-code fan as a programmer.

Quest Automation Research of Farnham, Dorset, was among the first to show interest, and told us: "We are currently finding difficulty in recruiting programmers with machine code/assembly language abilities, and would be extremely interested to hear from any."

Director of Etonfield, the microcomputer and electronic systems specialists, M. Moorhead, wrote,

"Yes, there are hundreds of us who have made it in machine code and are still doing so. I have worked almost exclusively in machine code for the past 20 years and have personally trained about 200 others to handle it efficiently, who have in turn written literally thousands of machine code programs. Machine code is easy to use and to understand, fast to construct, highly efficient and in some cases essential — how do you construct a 10-microsecond monitoring loop in Cobol, for instance?"

So there is still hope for Chris and the many others like him. As Moorhead concludes, "Somewhere out there is someone who thinks that all us machine code programmers are extinct, but he'll be searching for possible survivors."

## Is your job worth less than a sales representative's?

THERE is nothing quite so interesting as finding out how much other people earn. Even more fascinating is finding out how much you are supposed to earn yourself.

Thankfully, many surveys appear that can tell you roughly how much your peers are earning, even if they cast little light on why you aren't on as much.

Money is close to most people's hearts and usually the only reason why anybody actually gets up and goes to work every day. Computer programmers are by now accustomed to being called valuable, rare and in short supply. What they are not yet renowned for is being particularly well-paid.

The most recent survey brought out by Reward Regional Surveys in conjunction with Professional and Executive Recruitment does not do much to alter their financial hopes.

According to the survey, the maximum that a 30-year-old programmer can expect to earn is £8,400, which is less than a personnel officer, less than a sales representative, less than a maintenance engineer and less than a training officer.

Systems analysts, however, can expect to earn up to £11,000 a year more than a programmer, with their salary rising to something like £9,940 at the age of 40 to 45.

Averages can often be misleading, of course, and in many cases the sample taken by the compilers of the report is very small.

Another interesting revelation is made when salaries are compared in different geographical areas. The report compares salaries in 12 areas of the country. Inevitably, Central London staff receive the highest rates of pay, generally between 20% and 40% above the national average. Surprisingly, though, the national average for a computer programmer is still only £4,250 and £8,150 for a systems analyst.

As usual, salaries are at their lowest in the North and in Wales, which hits an all-time low with an average salary of £3,950. Even taking into account lower living costs it still doesn't sound too good.

Wales is closely followed by Yorkshire, Humberside and the North-west as the most undesirable places for programmers to

move to. However, a systems analyst living in the Eastern Counties can earn about £1,500 a year more than one working in the North-west, whereas two computer programmers living in these same areas would be on roughly the same salary.

Similar discrepancies always occur in reviews such as this. A report published last year by a different company gave the national and regional averages as much higher than this year, and also quoted salaries in London, the Midlands and the North-West as being more or less the same (Programmer Notes, September 27, 1979) at an average of £8,800.

Indeed, if you look through the job ads in computer publications it is interesting to find that there is often little difference in regional salaries, except for London where pay has always been higher.

Salaries in the South are usually marginally higher than in the North, but then so is the cost of living, and most readers will appreciate from experience that the difference is negligible, when everything is taken into account.

Obvious differences apart, the whole question of salary raises

some important issues. How important is the work of a programmer? How much are they worth?

For a long time the BCS has been debating whether computing is a profession to be classed with law, medicine, accountancy or engineering. If programming is to come in line with the established professions one would hope the rewards would be the same.

On the other hand, if sales representatives and indeed bus conductors can earn as much if not more than programmers — why do they?

Over the next few weeks we hope to investigate the salaries of programmers and analysts in more depth. In the meantime, if anyone has any enlightening information on the subject which they feel may interest other readers, please let us know.

### SNH the TOPS

IN my report about Geoff Sushy and the BCS Specialist Group for the disabled (Page Six, January 31), a slip of pen extended the length of the TOPS course. This does, in fact, last for 18 weeks.

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## SOFTWARE FILE

### ICL in IDMS deal for S African 370

A CONTRACT to supply software from ICL for an IBM 370/155 system has been made between ICL South Africa and Afrox, a supplier of industrial gases. Afrox is to replace Cincom's Total, its present data management system, with Cullinane's Integrated Database Management System, for which ICL holds the licence in South Africa.

### Cincom asked to bridge Prime gap

AT a time when sales are booming Prime is looking to Cincom to fill a gap in its software services. Prime is already marketing Cincom's database management system Total in Australia and Japan, and negotiations to take Total on board in the UK are underway.

Although Prime says that its own software products can cope with both ends of the scale in database requirements, it is hard-pressed for mid-market software which will satisfy simpler needs including easy access and multiple file handling.

Michael Grant of Prime's European marketing said that Total's "high user acceptance and portability" would be a sales asset, adding "Prime has a positive approach to software houses which have good proven packages and is looking towards further software releases."

Cincom has released a version of its online interactive query language T-ASK for use with Total on Digital Equipment PDP-11s, following worldwide success with the product on IBM hardware.

### MSP in Brazil

SYSTEMS house MSP which sells Datamanager, Testamanager and Data Dictionary is spreading its wings with a new sales branch in Brazil and a large contract with a Hong Kong bank which the company hopes will give it the entry into the promising Oriental market.

The firm has reached an agreement with SCI of Rio de Janeiro to market MSP products in Brazil, where there are already customers among government and banking interests. Datamanager installations also exist in Venezuela and Curacao.

Another factor affecting the decision to buy from ICL was Afrox's impending conversion from IBM DOS/VS to the OS/VS operating system, in which light IDMS offered the best combination of price and performance.

The contract furthers ICL's policy of installing its software on competitive equipment, already successful in South Africa where there are several IDMS customers.

The sale coincides with the release in South Africa of ICL's transaction processing monitor package TP Manager. It will come into competition with the Telecomputing product TPS, which already has a dozen or so customers.

### US government blessing for Micro Focus CIS Cobol

THE Micro Focus product CIS Cobol has become the first microcomputer Cobol system to win US government certification from the General Services Administration. Managing director Paul O'Grady said that this would open the way for widespread use of microcomputers in government business into processing operations, as federal offices and agencies form a large part of the US software market.

### Belgian office

THE formation of a new subsidiary in Belgium has been announced by SPL. The company, SPL Belgium S.A./N.V., will operate from offices in Brussels and will market in Belgium and Luxembourg.

Its principal market areas to be in industrial finance and banking and large transaction processing systems as well as basic software.

GSA certification means that the system is qualified for use by contractors supplying equipment and software to government agencies. Micro Focus is the only software house among the 17 listed suppliers, and apart from CII-Honeywell Bull, the only company of European origin.

Distribution rights to the language were recently acquired by the Oxford firm Telacomputing for use on ECS 4000 and 4500 microcomputer terminals.

### Graphics made easier

ENGINEERS who have no special training in software or computer usage can now handle complex calculations on Tektronix 4051 graphics computer, and get an immediate pictorial view of the results. The Compact 1013 graphics package is from Engineering

Sciences Data Unit, which is owned by the Royal Aeronautical Society. The system designed to aid engineers in calculating the stresses and deflections encountered in flat plates under pressure loading, and is already being used by Boeing Aerospace in the US prior to its official release.

### IDMS available for 4300s

A NEW release of Cullinane Corp's Integrated Database Management System is fully operational under DOS/VS for IBM's 4300 processor.

In announcing Release 3.5 of IDMS, senior vice-president Bob Goldman said "It has been designed to operate not only on the 4300 in a stand-alone mode, but in a way that incorporates the whole concept of distributed processing."

"The new system permits the physical and logical separation of the application program and the DBMS, making IDMS the only database management system that takes advantage of the 4300 in its intended fashion."

### UK firm is named on Datapro roll

A UK company which sells in the US by telephone has had two of its products named in the 1979 Datapro honour roll. Boost, a performance optimization tool, and Logout, an activity tracer and test aid, were both developed by Macro 4 of Wellington.

Macro 4's sales branch in New Jersey has relied on telephone selling, which has had widespread success. Customers in Iceland, Oman, Nigeria, Liberia and Hong Kong have installed their own systems having contact with Macro 4 only by mail, telephone or telex, and there are over 600 users of Logout and Boost in the US and Canada.

The roll identifies packages which earn high overall satisfaction ratings from users, and the 44 products named were selected from over 2,000 packages evaluated by nearly 5,700 participants. Others on the roll include one other UK company, Altergo, with Shadow II, and ADR's Volle and Librarian.

### Field test for System Ten's WP facility

THE word processing facility for the ICL System Ten is being given its first site testing by Melhower International Business Services at the World Trade Centre in London.

The company, which provides business consultancy for resident firms and visitors to the centre, had already ordered three System Ten 120s, which were recently launched by ICL as low cost processors for first-time users.

The addition of word processing to the System Ten 120 and 220 is part of ICL's venture into "information processing" which started with the combination of word and data processing on the 7700. Other data processing jobs can run concurrently with the facility, up to eight on the 120 and up to 18 on the 220.

It is available from £8,000 including screen and Quine printer, and ICL says that this new facility will make it possible

to have a complete business system including information processing, hardware and general application software for under £30,000.

Melhower ordered four word processing facilities after the product launch at the International Business Show in October. They are purchased as a link between two aspects of the firm's business, office representation and the computerisation of accounts.

### '50% better' claim

A "DROP-IN replacement for VSAM and ISAM" is being launched by Innovation Data Processing of Clifton, New Jersey. The firm claims that IAM V4.0 can provide reductions in CPU time for batch systems and an improvement of 50% in response time for CICS users, needing only a simple JCL change to become effective.

Hoskyns Modular Application Systems (MAS), are a total systems approach to the information and control requirements of organisations. During the past ten years MAS elements have been built for most applications in industry, finance and commerce. Over 1500 MAS elements have been installed worldwide. The table below gives an overview of some of the major sectors covered by MAS and other Hoskyns standard systems.



### Hoskyns Modular Application Systems

Industry or Commercial Sector	Computer			Hoskyns Modular Application Systems					
	Mainframe	Mini	Micro	MAS I	MAS II	MAS-M	MAS-H	KIDS	Special Sys
Accounting	✓	✓	✓	✓		✓	✓		✓
Banking	✓	✓	✓						✓
Distribution	✓	✓	✓	✓		✓	✓		
Foundries	✓								✓
Hotels			✓						✓
Housing Associations	✓								✓
Insurance		✓		✓		✓			✓
Leasing and Hire Purchase		✓				✓			✓
Manufacturing	✓	✓	✓	✓	✓	✓			
Retailing	✓	✓	✓	✓					
Shipping	✓	✓	✓	✓		✓	✓		
Vehicle Contract Hire and Fleet Control	✓			✓					✓

MAS run on a wide variety of computers, including the major manufacturers shown here.

IBM  
ICL  
DEC  
HP  
IBM  
TI  
INTEL  
TI

If you would like further information on any MAS, please contact Brindley Reynaud at Farringdon Road.

**hoskyns**

Hoskyns Group Limited is a wholly owned subsidiary of Martin Marietta, an international corporation with a turnover of more than \$2,000m. MAS is supported throughout the world by Hoskyns and Martin Marietta Data Systems with a professional staff that exceeds 2000.

Page 1254

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## OP SPOT

## Engineers' hints can prove useful

MOST engineers are only too willing to help the operators. Take the trouble to speak to them and you will learn a lot about your system hardware.

This piece of advice comes from Colin O'Keefe. An assistant operations officer with British Airways in London, he recently picked up a useful hint in this way.

It relates to tape controllers. He explains, "Probably all operators have seen their engineers testing faulty tape drives (or servos, or whatever tag the appropriate manufacturer gives them) through the tape controller."

"However, I don't suppose



Colin O'Keefe

"The importance of the loss of data, and whether the above action should have been taken in the first place, is naturally decided by the shift supervisor."

From the technical viewpoint, O'Keefe's hint is very good. It's direct and, by skipping the faulty blocks, can alleviate the need to recreate tapes or re-run jobs.

## Computer room environment

THE computer room environment is the subject of a meeting to be held by the Central London Branch of the Institute of Data Processing Management on Wednesday, February 20. For further information contact Colin Smith on 01-558 3761.

## Frequent meetings keep staff in touch

by Bernard Allen

HAVE you ever walked into the computer room on a Monday morning to discover an unexpected new release or version of the operating system or additional piece of hardware?

If you can answer "yes" to that question (and in truth, that happened to me when I was an operator) then there is a severe lack of communication between management and operations staff at your installation.

But you are not alone. The fact is that at many sites the operators are often the last to know about changes which will affect them in their daily working life.

At the smaller installation the manager can keep his six or eight operators informed by word of mouth. He may call them into his office every two weeks or so, or even stand the

occasional round in the local pub.

That just won't work at the larger installation, though. Regardless of whether you like it or not, and personally I don't, some kind of formal procedure must be used.

One way the manager has of keeping the operators up to date about developments at the installation is to send out lots of memos.

Memos provide a quick and easy way of keeping the staff informed about what's going on at the site, providing, that is, the operators take the trouble to read them. In my experience, they don't always do this.

The notice-board is a much better medium for communication between management and staff. It may be placed in the main reception area, the rest room or even this computer room itself. The operators should be encouraged to make a habit of reading it.

However, as with memos, the notice board is severely limited in that it provides one-way communication only. Messages are left by members of the upper ranks for consumption by the operators, who seldom get the chance to respond and forward their views.

And so we come to staff meetings. These tend to be frowned upon as time-wasting affairs at some installations, while at others they seem to take place almost every other day. Which is the right approach?

In my opinion, such meetings provide an excellent means for the operators and their seniors to get together and actually discuss all sorts of matters important to the smooth running of the installation.

It's important that the shift team meets in the rest room for an hour or so at the beginning of each shift rota. There is no need for the meeting to be over-formal, but it should be controlled by the shift leader to a certain extent. Discussion might centre on such matters as:

Complaints. If one of the operators feels he is getting more than his fair share of the less stimulating and technically demanding tasks, then this is the time to speak up. The rest of the shift should be encouraged to respond as it will prevent ill-feeling arising between team members.

Problems. It is important that the operators are kept up to date about such matters as staff shortages, whether they are caused by holiday, sickness or persons leaving the site. In the

evnt of a contractor being hired, the shift meeting enables him to be introduced to the permanent staff.

Errors. Regardless of how good or bad the team is, mistakes in the computer room are inevitable and must be accepted to a certain extent. They should be examined in an objective manner to avoid repeating them. And it goes without saying that the person responsible should be given every opportunity to speak up for himself.

Suggestions. Imaginative operators often come up with ways of saving time and effort in the computer room. Where applicable, the tricks of the trade should be adopted as installation standards, and the person responsible given full credit, particularly where salary reviews are concerned.

Deployment of staff. The shift leader should also use the meeting to let the operators know what they will be doing — quality control, printers, disc area, main console, or whatever — during the coming week. Again, it should be open to discussion.

After shift meetings come those where each shift is represented by one or more of its members. They should be held about once a month and chaired by the operations manager or chief operator. The agenda might include:

Plans for hardware or software upgrades. The operators must be informed about additions to the system, not only for their own sake but also for management's.

Let me give you an example of why this is so important. At one installation I know a new bank of disc drives was added to the system and the operators were expected to operate them during the normal course of their duties.

Problems arose because one of the drives was faulty, a fact not discovered until a few days later, with the result that several disc packs were ruined. Had the operators been told to look out for signs of trouble they might have saved the site the time and expense of recreating the lost data.

Complaints about other shift teams. Have you noticed how each shift team thinks it's the best the installation has. In truth, each has its shortcomings and these should be discussed openly and frankly.

The operators should take it in turn to attend these meetings and report what happens to the rest of their colleagues.

## What is a fair rate for shift allowances?

AN operator contacted me this other week with a query about shift allowances.

At his installation the operators staff get a 33% allowance for providing 24-hour cover seven days a week. Is that a more or less standard rate for a twelve-hour pattern? he asked.

Well, this allowance does tend to vary quite a bit from one installation to the next. Much depends on the attitude of the company and just how good the union (assuming one is involved) is at negotiating on behalf of the operators.

Terry Molloy of the Banking, Insurance and Finance Union has vast experience of negotiating on the side of computer staff.

He told me that BIFU tends to favour a points system for calculating the allowance. That way more points are awarded for the most unsocial hours — Saturday, Sunday, Friday evening — and fewer for, say, Monday and Tuesday days.

On this basis staff at one of Barclay's Bank's installations get a 46% allowance for working a 24-hour, seven-day system.

Certain non-operations staff within the bank do even better — they get a 64% allowance for working a 12-hour, seven-day pattern, which is more demanding in terms of the weekend hours involved.

Both are considerably higher than the allowance paid at our friend's installation.

## Laser imaging system

FACSIMILE reception is one of the likely application areas for a laser-based imaging system that can form a viewable 2,000-line picture measuring 10 x 8 millimetres in 12 seconds. The system is under development by Bell Laboratories at Murray Hill, New Jersey. It uses a material consisting of a transparent polyester substrate 100 microns thick with a metal film on top. The film comprises a 600 angstrom thick layer of bismuth beneath a layer of selenium of the same thickness.

Seven grey levels can be achieved by the laser punching holes of varying thickness and spacing in the metal film: the deeper and closer the hole the greater the amount of light that can pass through.

Like a microfilm frame, the image could be viewed by magnification and projection and with more than three million picture elements (1,600 holes per inch) and seven levels of grey the definition should be far superior to conventional paper facsimile.

## Digico courses

DIGICO's customer training and software package development are now being provided by Digico Management Services, a new subsidiary based at the company's existing training centre at Harrogate.

Three regular courses are now being run at Harrogate. They are Basic programming on Digico computers, the Digico assembly language and an introduction to computers for customer personnel with no programming experience.



Instructor Chris Townsend demonstrates a micro-based business system to a group of students at the Post Office's new computer school.

## PO opens computer school in London

THE POST Office has opened a new computer school in central London to bring the scattered training activities of its Data Processing Executive under one roof.

With 3,300 staff and over 70 computers and minis, the Data Processing Executive claims to carry out more training on computers than any other UK organisation. In the new centre it expects to provide 2,500 student places a year on 30 courses, covering the programming of System X exchanges as well as systems design, management, operations and programming in Coral and other languages.

Hardware available to students includes two Research Machines 380Z microcomputers in the school and terminals which can be linked to an IBM 3033, ICL 2960s, 2970s, 2980s and

System 4s or a Burroughs B6611. Training is offered to outside organisations at home and abroad, as well as within the Data Processing Executive, which itself offers services to organisations other than Post Office Telecommunications under the name National Data Processing Service.

Internal services include stores inventory of 2.5 million items and billing of 300 million phone calls a year to 62 million accounts. External services include LACES, the London Airport cargo system, and its successors now under development: the ACP 80 Bureau and HM Customs' Departmental Entry Processing System due to go live late next year.

The new school was opened by Peter Benton, managing director of Post Office Telecommunications.

## CII-HB plugs gap in DPS 7 range

TWO further models have been announced in CII-Honeywell Bull's DPS 7 line, filling in the gap between the Level 64/DPS 2, 4 and 6 models announced in March 1979, and the DPS 7/80 and 7/82 announced last September.

The new models are the DPS 7/60 and the DPS 7/70, with main processor cycle times of 210 and 180 nanoseconds respectively. Both models come with two, three or four megabytes of main memory.

Operating systems supported are GCOS 64E, Siris 8E for users of the Iris 80, and Siris 3E for users of smaller Iris machines. No recompilation or file adjustments are necessary to run existing software under the appropriate "E" version of the operating systems. All three operating systems are supported on the 7/60, 7/70 and 7/80 with the appropriate microcode, while the 7/82 runs only Siris 8E, since it is a dual processor machine, and Siris 8 is the only CII-HB operating system at present available in an MP version.

The 7/60 is about twice as powerful as the Level 64/DPS 8 and approximately equivalent to a single processor Iris 80. The 7/70 under GCOS 64E is about 1.5 times a 7/60 and about 75% of a 7/80.

Any DPS 7 model can be field-upgraded to the next model in the line.

The two new models are built around a 25 megabyte per second bus, and input-output, peripheral, mass storage, service and main processors are all specially designed for the function in current mode logic. The use of multiple processors within the central processing complex enables many functions to be executed simultaneously, and the main processor itself consists of seven sub-processors which can also execute in parallel. The 7/60 supports a maximum of 18,000 megabytes on disc and the 7/70 21,000 megabytes.

First deliveries are set for the last quarter of the year; the 7/80

in typical configuration rents for FF 125,000, £13,000 a month including software, and the 7/70 for FF 160,000, £17,000 a month. The machines are announced only in CII-HB territory.

● In the US, Honeywell has repackaged its version of the CII-HB Level 64/DPS 2, 4 and 6 as a single model called the Level 64/DPS 330 (CW, January 31). The original two models were configured to compete with IBM's 4331 and 4341; the base price for the 330 is just below that for the 320.

Memory ranges from 512K to 2 megabytes. A new release of the GCOS 64 operating system, called 0500 will be available in the fourth quarter of this year, offering a new indexed access method for creating secondary indexes, support for interactive execution of Cobol, Fortran and RPG language processors, an interactive program checkout facility, and a facility for transferring files to and from the Level 8 minicomputer.

## Micro packaging technique

THE CII-Honeywell Bull DPS 7 main and input-output processors are built of current mode logic integrated circuits assembled using the micro packaging technique which CII-HB developed and Honeywell failed to implement successfully for the Level 64/DPS mainframe which was eventually abandoned.

The technique involves mounting up to 38 unencapsulated chips on to a 5 cm by 5 cm multi-layer substrate. CII-HB reports that as well as improving performance because the technique enables chips to be mounted closer together, reducing the propagation delay, it also gives a significant improvement in reliability. The reason for this is that the most troublesome and vulnerable aspects of an integrated circuit are the connections to the outside world, and CII-HB says that the automatic technique it has developed for bonding the chips to the substrate have proved very effective.

It is possible to remove chips from the substrate manually and effect repairs, but this is mainly done in the prototype stage. The chips for micro packaging are bought from outside suppliers. CII-HB has licensed a Swiss company, FAG, to make and sell the machines and tools developed for micro packaging.

IS THIS WHAT YOU EXPECT TO LOSE WHEN YOUR COMPUTER GROWS OLD?

## HOW CAN A 3-MONTH-OLD COMPANY COMPETE WITH IBM?

When the activities of Intel's computer products division were taken on by National Semiconductor, the name National Advanced Systems entered the market-place.

The result: a unique assembly of talents, engineering abilities and products. All under the banner of a parent which is one of the world's most successful semiconductor makers, has made more IBM plug-compatible computers than anyone else, and has a growth rate appreciably better than the industry average.

So when you hear of NAS, you'll know it's no newcomer but a company with 12 years' experience in CPUs, peripherals and software.

A company which is more than capable of taking on even IBM.

Not bad for a three-month-old.

**National Advanced Systems**

new division of National Semiconductor.



1979/1/15/2



## PEOPLE and EVENTS

## Aldrich takes over from Keyes at Redifon

REDIFON Computers has announced the appointment of Michael Aldrich as managing director. Aldrich joined Redifon in 1977 as marketing director and has spent his entire career in the computer industry in positions which included senior sales representative for Burroughs where he worked for seven years. He has also worked for Honeywell.

As managing director he takes over from Koff Keyes who has taken up the post of managing director of Redifon's sister company in Europe, Redifon Computer Machinery Corp. This company was formed last year when the parent company, Redifon, bought CMC Europe, which owns CMC France, CMC Germany and nine other companies operating in Europe.

Keyes will continue as director of Redifon Computers but his aim is to devote more time to the company's interests in Europe.

Bob Muslon has joined InterCity computer bureau as sales director. Previously he was group systems manager of the Frederick Parker group after six years in marketing with IBM.



Aldrich



Keyes

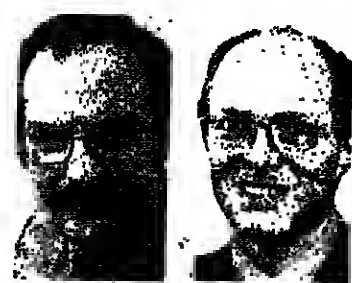
Noel Atkins, formerly sales manager of Scan Computers, has been promoted to sales director. One of his responsibilities will be to set up a network of sub-agencies throughout the UK.

Alan Johnston and John Moats have become managers of Rostronics' new Glasgow office. Both are directors of EWL Computers.

Mike Dillon is Computer Machinery Company's new territory manager responsible for sales of CMC products in Merseyside and North Lancashire. He was formerly with Mills Associates of Stockport.

Ian High and Terence Smith have joined Freight Computer Services as sales executives. High was formerly head of production and Smith has worked in systems analysis.

Aidan Daley has joined Datron Micro Centre as a member of the company's professional team. Daley, a hardware specialist, formerly worked for Hadfields in their special projects division and recently returned from Hawaii where he commissioned the control system of his own design, for an infra-red telescope.



Bursall

Adia

OBITUARY  
Sir Edward Lewis

FOUR days after talks with Racal for a takeover of his company, Sir Edward Lewis, chairman of Dacca for almost 20 years, has died aged 79.

Sir Edward started out as a stockbroker; the firm that he founded launched the Dacca Record Company on the market in 1928, and two years later, when it got into financial difficulties, he joined the board.

During and after the war Dacca diversified from a record, gramophone and radio company into electronics, and growth in this sector, coupled with personal success for Dacca until the early 1970s, when its business went into decline.

Kenneth Eaton has become vice-president of the Society of Electronic and Radio Technicians. He joined the central staff of the Ministry of Defence in 1978 as assistant director of signals where he has been concerned with the future development of joint services and NATO communications.

Barbara Ruben has been appointed as a senior consultant for the information provider services division of Information Services and Equipment, the viewdata specialists.

George Murray has become head of group management services with Pilkington. He joined the company in 1957 and since then has held several positions in the firm including production planning and control manager and management information systems manager. Since 1977 he has been deputy head of management services.

Robert Dwyer has been named as worldwide marketing director for microelectronic devices for Rockwell International. He will be responsible for all domestic and international sales.

## DIARY

**FEBRUARY 6-7**  
IBM CUS telecommunications group. Palace Court, Bournemouth. Tel: 01-551 1643.

**FEBRUARY 7**  
Visit to Lloyd's BCS Kent branch. Chatham. 10.30.  
The future of BCS and presidential visit. BCS Chester and North Wales branch. Halfway House, Conner's Quay, Clwyd. 10.30.

**FEBRUARY 12**  
Map-making by computer. BCS Croydon branch. Fairfield Hall, Croydon. 10.15.  
Voice response systems. BCS Harlow sub-branch. Saxon Inn, Harlow. 10.30.

**FEBRUARY 13**  
Use of computers in MR weather forecasting. BCS Newcastle branch. Barras Bridge Refectory, University of Newcastle, Newcastle. 10.00.

**FEBRUARY 12-13**  
IBM CUA small systems group. Holiday Inn, Leicester. Tel: 01-551 1643.

**FEBRUARY 13**  
Technical directions. BCS Bristol branch. St Vincent Rocks Hotel, Clifton, Bristol. 10.15.

**FEBRUARY 14**  
Computers in newspapers. BCS North London branch. West Lodge Park Hotel, Cockfosters. 10.45.

**FEBRUARY 15**  
CAD at Ford. BCS Sussex branch. County Hall, Lewes. 10.30.

**FEBRUARY 16**  
Computers in the 80s. BCS Humberside branch. Hull College of Higher Education, Hull. 10.30.

**FEBRUARY 14**  
The IBM System 38. BCS advanced programming group. Prudential Assurance, Holborn Bars, London.

**FEBRUARY 15**  
What are networks? IDPM Essex branch. County Hotel, Chelmsford. 10.00.

**FEBRUARY 16**  
IBM CUA Scottish group. Dunblane Hydro, Dunblane. Tel: 01-551 1643.

**FEBRUARY 17**  
Have computers any place in the

doctor's surgery? BCS Oxford sub-branch. Staff Coffee Lounge, Oxford Polytechnic, Oxford. 10.45.

**FEBRUARY 19**  
Controlling EDP in the 80s. BCS auditing by computer group. Paat and Marwick, 1 Fuddle Dock, London. 10.30.

**FEBRUARY 21-22**  
IBM CUA operations group. Shakespeare Hotel, Stratford-on-Avon. Tel: 01-551 1643.

**FEBRUARY 27**  
Microprocessors for developing countries. D. Waller. Followed by wine and cheese. BCS specialist group for developing countries. British Council, British Council Students Centre, Portland Place, London. 10.15.

**FEBRUARY 28**  
Confidentiality and statistics. BCS/Royal Statistical Society, University of Strathclyde, Strathclyde. 10.30.

**MARCH 3**  
SNA and its alternatives, and AGM. BCS Data Communication group. Institute of Education, Bedford Way, London. 10.30.

**MARCH 4**  
Online information users in Scotland. BCS Information Retrieval group to inaugurate a Scottish group. Contact L. Corbett, University of Stirling, Stirling.

**MARCH 5**  
Query languages. BCS Database users. University College, London. 10.00.

**MARCH 11**  
Data protection legislation and the likely effect on you. IDPM Essex branch. County Hotel, Rainford Road, Chelmsford. 10.00.

## Siemens ready to co-operate with other European manufacturers

SIEMENS has declared its readiness to discuss any proposals for co-operation with other European manufacturers in the computer field. CII-Honeywell Bull has already put forward concrete proposals for collaboration and standardisation, and its initiative has been welcomed by ICL (CW, January 24).

## IGL says 'We will win whatever the rules'

THE ending of single tender purchasing of computers for government under EEC rules next year, holds no fears for ICL. At present the company is doing about 5% of its total business — between £30 million and £35 million in the year 1978-79 — with the government under single tender rules.

The company says, "We expect to win much of this business whatever the rules, and we would be very happy if the EEC introduced Community-wide preferences for European-owned computer companies. As it is, it is almost impossible for us to win government business in any EEC country where the government protects its own industry. But whatever the EEC rules are, we support the French government to find some way of giving preferences to CII-Honeywell Bull."

The EEC Commission is however, saying it would be impossible to give absolute preference to European companies, but ICL says that it is asking only that an order should go to a European company where other factors were equal.

Siemens has now said that it does not want to manufacture everything itself, and that a mutual exchange of products to broaden the product ranges of each company would be a logical and effective means of collaboration. The company also says that exchanges of manufacturing licences might be considered.

According to Siemens, contacts have already been made

and discussions held on standardisation. It would welcome and be ready to discuss concrete proposals for further collaboration.

With Olivetti's re-entry into the mainframe market, albeit at present only working with the ICL and IPL mainframes (CW, January 31), there are four European-owned companies in the mainframe field, and others like Nixdorf should not be discounted.

## Computervision introduces new CAD/CAM system

COMPUTERVISION, the firm that claims 50% of the European market for computer aided design/computer aided manufacturing systems, has launched Designer V, a CAD/CAM system which employs a powerful purpose-designed minicomputer which supports fast raster scan displays.

Designer V takes advantage of increasingly cheap hardware and supercedes Computervision's existing CAD/CAM systems which employ a general purpose mini and much slower storage tube displays.

To take full advantage of the much greater power of Designer V, in particular the raster scan displays, Computervision has also introduced CADDS 4, a new version of its software package.

Computervision Automated Design and Drafting System.

The Designer V and mini is called CGP-200 and combines special processor called the Graphics Processing Unit, GPU, with a floating point computational unit, a memory protection and mapping unit and a general purpose CPU which handles non-graphics functions.

The GPU incorporates hardware dedicated to graphics operations like zooming, panning, windowing, 3D rotation, scaling, instantaneous perspective, multiple viewpoints and symbol insertion. It operates simultaneously with the rest of the CGP-200 hardware. Existing Computervision users will have to pay a \$120,000 upgrade to a CGP-200 which comes with a

minimum of 328K words of main memory. The other main part of the Designer V system is a completely new workstation called Instaview which, as the name suggests, enables changes to be made quickly to the graphics on the screen. The contents of the refresh memory in the raster scan display are updated as soon as the new view has been worked out by the GPU, which takes no more than a few seconds.

The Instaview workstation also includes a digitising tablet with a 17 by 24 inch surface that can take full A2 sized drawings. The tablet also provides a menu made up of 427 user definable touch sensitive squares from which graphics manipulation

functions can be selected.

Each Instaview station costs \$44,900 including a controller called the Video Generation Unit which comes with 32K of 16-bit memory and resides in the CGP-200 cabinet.

Computervision has about 1,000 CAD/CAM systems installed worldwide, including 240 in Europe.

Mechanical engineering companies have taken over from electronics manufacturers during the last two or three

## Univac wins \$19.3m airline order

UNIVAC has won an order from the world's largest air carrier, United Airlines, for an 1100/83 system worth \$19.3 million. Applications for the machine will include flight planning, flight operations and crew management.

## More power to interactive graphics

APPLICON, a CAD/CAM manufacturer, is to introduce a more powerful interactive graphics system. Called Image, Interactive Multi-Activity Graphics Environment, the new Applicon system features a 32-bit minicomputer dedicated to processing complex graphics data, a new 18-inch 7-colour raster scan display and the 21-inch black and white raster unit shown here.

These displays can be handled on the same Image system with the Tektronix storage tubes traditionally used by Applicon customers.

The 32-bit processor is called the Graphics 32 and is used in conjunction with a Digital Equipment PDP-11 mini which runs the Image operating system. The system is based on DEC's real time, multi-tasking operating system, REX-11M.



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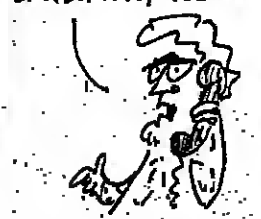
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Civeware File  
by Dm

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## MICRO NEWS

# Sinclair's £100 system will test personal computer market

THE ultimate test of whether a truly personal computer market actually exists has now started, following the introduction last week of the ZX80, the new microcomputer from Clive Sinclair's Sinclair Research company, which has been developed specifically with a price of under £100 in mind.

In the end, that price has been beaten by 5p for the assembled version of the system. This will be available in a mail order basis from March, at £99.95. A kit version will be available from this month through Sinclair's associated company, Science of Cambridge, at £79.

To meet this price, the company has had to use a variety of novel approaches to system design, some of which mark interesting breakthroughs, while others are perhaps dubious, especially in terms of the future of the system as the basis for expansion.

The system itself is very small, measuring 9 x 7 x 2 inches, and also light, weighing only 12 ounces. Into this package is squeezed a Z80A microprocessor supplied by Nippon Electric, a large ROM containing a 4K-byte specially written Basic interpreter, the character set and monitor, and interfacing cir-

cuitry. Input is via a touch keyboard, and output is via a modulator to a standard black and white TV.

Among the interesting novelties of the system is the use of dedicated control keys on the keyboard for some basic programming commands, such as "PRINT". This, with a newly developed but unspecified method of packing data more efficiently into memory, has allowed the ZX80 to use just 1K-byte of RAM. According to Sinclair, this is the equivalent of 3 to 4K-bytes in other systems.

Memory can be expanded up to 18K-bytes by the addition of external modules, through the system's single uncommitted I/O port. The other port is dedicated to interfacing with an audio, cassette storage system.

Another interesting aspect of the system is that, although there is only one uncommitted port, it can be continued through the expansion modules so that peripheral devices can still be used. A printer, therefore, can be attached to the memory expansion system, which is itself attached to the main I/O port.

The main disadvantage of this would appear to be that the "bus" is not buffered, and any full expansion attempt would

probably need a specifically engineered buffered interface that would effectively become a motherboard on which the system hung.

The company has also used "old" technology to help break through the £100 price barrier. It claims that the ZX80 has a tenth of the components of comparable systems, and has helped to achieve this by dispensing with the use of dedicated controller chips for such items as the display. In the ZX80,

all I/O operations are controlled by the CPU. Given the size of the basic system, this incurs no operational penalties. In fact, Sinclair claims that the ZX80 is faster than a Commodore Pet. This classic Von Neumann architecture, however, appears to entail several operational limitations of the system is expanded.

On the basis of any cost/benefit analysis of the standard system, however, the ZX80 will no doubt attract considerable

interest, especially in one of its prime potential markets — education. Though Sinclair sees the system eventually finding its way into industry and professional use, it is the educational and home education market that is being viewed most seriously.

As Sinclair (seen below left with the ZX80) said, "We see this helping to achieve the new numeracy we are all going to require. No child should be without computer experience."

by Martin Banks

## Specialist in Pet packages

A NEW software house specialising in applications packages for the Commodore Pet has been formed on the South coast.

Called Anagram Systems, it is working in close co-operation with the Brighton-based Pet dealer, Amplicon Micro Systems, and has already come up with one package that has been formally approved by Commodore for the Pet computer.

This is the Anagram Stock Control System, which provides full screen formatted input fields, and comprehensive input data validation.

Scotland 18, 19, 20 March — Albany Hotel, Douglas Street, Glasgow  
North West 11, 12, 13 March — New Century Hall, Corporation Street, Manchester  
Midlands 4, 5, 6 March — Albany Hotel, Smallbrook Queensway, Birmingham  
London 25, 26, 27 March — West Centre Hotel, Lillie Road, London SW6

# COMPUTERMARKE'80

## Your first computer?

If you're thinking about your first computer for home or office, a visit to Computermarket will save you time and money. You'll be able to compare prices in just one visit, see who is committed to your area, meet people who have installed the sort of equipment you are considering, check out after sales service arrangements with more than just one potential supplier and see computers performing the applications of interest to you. You'll see micro-computers from just a few hundreds of pounds and highly sophisticated systems costing hundreds of thousands. You'll be able to examine the enhancements you may later wish to add to your computer and check out that the system can be upgraded, investigate the availability and cost of the supplies that you'll need to get and keep your computer running. You might even actually see a silicon chip!

## ORM/System builder?

Hasn't your marketplace changed since you first thought about the business you're in? 16 bit micros, mid-computers, bread-boards for peanuts, matrix line printers, smart VDUs for the price of dumb ones, famous names that you hadn't heard of only months ago. Customized or off-the-shelf, it must sometimes look like the world and his wife is starting a systems house. Who is in your business in your area? A visit to Computermarket will tell you and a lot more besides. Including who can supply at least cost and fastest delivery.

## Computer user?

If you've already got a computer, you'll know who gives the best service on supplies in your area — won't you? You'll already know where you can get short delivery and best terms on the peripheral enhancements you plan — won't you? You'll be aware of the software packages that are available for your existing equipment — won't you? You've probably thought about the additional processor (or its replacement) you will need before too long — haven't you? Why not check and be sure. A visit to Computermarket will confirm that you are right and will continue to get the best deal on peripherals, ancillary equipment, services, software, supplies... and it will give you the opportunity to see micro and mini based systems in operation just to keep up-to-date and for interest's sake — won't it?

## Communications user?

Are you getting the most from your system? An acoustic coupler can cost very little and yet be the start of a communications network. Modems, multi-plexers... the hardware of data communications is developing fast and so is the environment in which the equipment may be employed. Communications experts will be at Computermarket so it's a terminal in another part of your building, distributing data processing or starting your own satellite communications network (1), a visit to Computermarket should prove to be a worthwhile investment and a chance to study PRESTEL at first hand.

## Who will be at Computermarket?

Advertisements such as these are prepared many months in advance of the exhibitions described, but it is already certain that Computermarket will be bigger than ever before — more than twice as big overall. Companies that had already reserved stands as at November (almost four months before the 1980 series of exhibitions) included: Zygal, Wootton Jeffrey, Willis Computer Supplies, Which Computer?, Weapac, Wang, Versatec, Tullis Nelli, Terminal Display Systems, Telemat, Tektronix, Tann Synchro, nome, Systime, Sumlock, Bondair, Star Computer Centre, Scotia Data Products, SEMS, Selborne Computers, SRL, Rostronics, Robot, RSC, Q-Pac Systems, Pragma, P.O. Office, Plesey Peripheral, Peterborough Data, Pickett Norton, Northern Software Consultants, Newbury Laboratories, Nashua, Nascom, NSC Computers, Modular Technology, Modco, Midtron, Micro Media, Micro Data Products, Micro Centre, Micro Bits, MCS Mini Computer Systems, Lynwood Scientific Developments, Lymn Peripherals, L.I.C.S. Products, Information Equipment Maintenance, I.T.I.C.S. Harwoods Business Machines, Hamilton Rentals, J. Goldsmith, General Audio & Data Communications, Quest Computers, GBC Computers, Excel, Elicom, Equicom, Digidata, Digico, Datum, Data Design Techniques, DRS Business Machines, DML, Cytek, Cost Effective Computing, Corner Computer Services, Computing Computer Workshop, Computer Weekly, Computer Management, Computer Ancillaries, Computronics, Com-



Clive Sinclair with the ZX80.

## Performa WP system now available in UK

ANOTHER US-manufactured microcomputer system, the Performa, made by Info 2000, has found its way across the Atlantic, and is being exclusively distributed in the UK by BSH Electronics of Swinton, Manchester.

Using a Zilog Z80A processor with 48K-bytes of RAM, it is being packaged as a word processing system that can provide other facilities for the small businessman.

Using dual eight-inch double-sided double density floppy disc drives offering 2.5 megabytes, a video console and an NEC word processing printer, it is combined with a word processing package called Text 2000, which runs under CP/M version 2.0.

Other software packages available include CPA 2000, which is a fully integrated accounting package.

## CP/M user group

A USER group has been formed for anyone using the CP/M operating system.

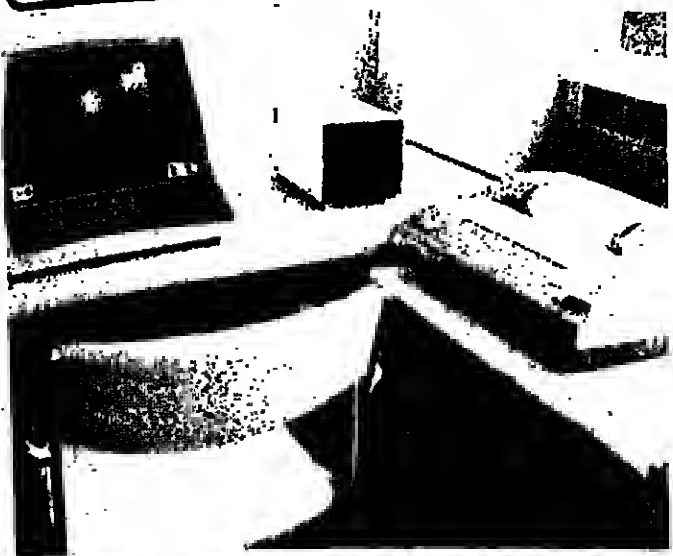
At present it is being run by MML, a firm of microcomputer consultants and conference organisers. To date there are 25 members, each paying a nominal £5 a year membership fee. A quarterly newsletter is planned,

with the first issue scheduled for publication this month.

Later in the year, the group could be holding a series of seminars on various aspects of the CP/M system.

Further information can be obtained from David Parvia-Lybbe at MML, 11 Sun Street, Finsbury Square, London EC2.

## MICROSYSTEMS 80



The new Series 800 microcomputer system from ACT was one of the few new items to see the light of day at Microsystems. Manufactured in the States by Compu-Think, which calls it the Minimax, the Series 800 marks the next stage in ACT's push into the microcomputer business. It already wins Petsoft, the Commodore Pet software specialist.

# Micros grow from a 'fun' to a business image

AN air of serious purpose filled most of the area of the Wembley Conference Centre where Microsystems 80 was held last week. It was an air that impressed some, and disappointed others, for it carried with it the unmistakable tinge of "business" rather than fun.

After three years, the microcomputer business is starting to become just that — a business. Not only that, but the industry is beginning to take itself seriously, and the visitors to the

show were by and large of the same intent.

This was a trend that tended to disappoint some of the more long-term members of the microcomputing fraternity — the ones that remembered the goggle-eyed wonder of the visitors to the first Microsystems, and the high degree of amazed interest and sense of fun that both visitors and exhibitors had for these wonderful new systems.

In the three years the show

has been running, those systems have changed very little. Some new ones have come in, and many of the early ones have been refined and enhanced, but many of the visitors to the show have by now seen what they have wanted to see, and had basically reached whatever purchase decisions they felt inclined to make.

This no doubt accounted for the early opinions expressed about the event by several exhibitors. The general consensus was that the level of serious inquiries being made was surprisingly high.

There was perhaps only one stand where the old excitement could be found, and that was Sinclair Research, where that archetypal entrepreneur, Clive Sinclair, was showing his latest baby, the ZX80 microcomputer. Discussed in more detail on page 12, the under-£100 micro proved to be a permanent draw for visitors, and always managed to be lost behind a crowd.

In the main, however, the tone of the show was subdued and serious, with the trend moving noticeably away from the idea of the exhibitors trying to sell clever boxes, and towards selling total systems packages.

This was perhaps most noticeable on the Commodore stand. Though the company is now poised to introduce a new version of the Pet offering 64K-bytes of RAM and a large, 80 column integral display — and is also now rumoured to have a colour version of the equipment available later this year — there was no pre-launch showing of either, as occurred last year with the 10K and 32K-byte versions.

Instead the company centred its display squarely on the field of its growing systems capability. Its stand was possibly the nearest thing yet to a software exhibition, with continuous demonstrations of its new range of applications packages. These included the stock control program, Comstock, the two versions of the Wordpro word processing package, Complan, a new payroll package for up to 200 employees, and Complaner, which the company describes as the ultimate personal information tool, providing address book facilities for up to 200 names, with a diary capability.

Down the alley on the Comart stand, a similar trend could be

detected, even if it was not so apparent. The company is about to announce an agreement with CAP to distribute through its own operation and dealer network the range of MicroCobol business application packages produced by the software house. This is the first time that Comart has moved into the applications program field to support the Cromemco and North Star Horizon systems it sells, though it has had systems software available for some time.

Comart's new division, the Byte Shop/Computerland chain of retail shops, was also present, though in a more subdued vein than previous years. Under the Comart banner, the product lines carried are to be rationalised downward from the range of 20 different systems that were previously carried. Among those to go are the Plessey minicomputer line, the South West Technical Products systems and several of the peripheral options. Mainstay of the new product line will be the Pet, Cromemco and Horizon systems, and the company is having clear-out sales at its six shops around the country of the equipment no longer to be stocked.

Another of the computer stores at the show, Isher-Woods, officially launched its new advisory service, called the Rite Hot Line (CW, January 17). With Isher-Woods centring its activities on Pet-based systems, the new Hot-Line service, inaugurated at the show, will allow members advice on both hardware and software problems on the Pet and other 6502-based systems. Membership is available for a £25 annual subscription fee.

One new system that did see the light of day at the show was the ACT Series 800. This is a Minimax manufactured by Compu-Think in the States, the company that already supplies ACT with Pet-compatible floppy disc drives. The system has been taken on by ACT to extend its operations into the microcomputer field following its early endeavours with Petsoft.

The Series 800 offers 108K-bytes of main memory, and can cope with up to 4.8 megabytes of online floppy disc storage using four 8-inch drives. Like the company's other favourite system, the Pet, the 800 comes with integral keyboard and display.

## In the Midlands?

Computermarket '80 opens at the Albany Hotel, Smallbrook Queensway, Birmingham on the 4th, 5th and 6th March between 10 am and 5 pm daily. The Albany Hotel has excellent facilities and is very conveniently located for car parks and New Street Railway and Bus Stations.

## In the North West?

The Manchester venue of Computermarket '80 is the New Century Hall (at the foot of the C.I.S. building) in Corporation Street, opposite Victoria Station, close by car parks and connected by bus with the Piccadilly Station. Computermarket — North West is open 11th, 12th and 13th March 10 am to 5 pm.

## In Scotland?

Regarded as Glasgow's finest hotel, the Albany in Douglas Street (on the corner of Bothwell Street) houses Computermarket '80 in Scotland. The hotel is within walking distance of the major railway stations and well provided with car parking and motorway access. Computermarket — Scotland is on 18th, 19th and 20th March between 10 am and 5 pm each day.

## In London?

Biggest of all the Computermarket '80 venues is at the West Centre Hotel, Lillie Road, London SW6. The West Centre Hotel is a few minutes walk from West Brompton underground station and is also convenient for the Earls Court underground. Limited car parking is available at the hotel itself. For those visiting London Computermarket is open 25th, 26th and 27th March with all venues, the exhibition is open from 10am to 5pm each day.

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# Singapore to make Indian micros

INDIAN-DESIGNED microcomputers are to be built in Singapore for the Far East market.

Hindustan Computers, one of the most ambitious and fast-growing companies on the Indian microcomputer scene, has established a joint venture company, Far East Computers Ltd, to build its Abacus line of microcomputers. Hindustan Computers owns 43% of the venture, the Singapore State

Economic Development Board will have 25% and the remaining shares will be offered in a public issue.

Shiv Nadar, managing director of Hindustan Computers, is to head the new venture, which is planned to be in full production by 1982.

Apart from Singapore, Far East Computer plans to market in Malaysia, the Philippines and Dubai. Markets in Hong Kong, Thailand, Indonesia, and several African and Middle Eastern countries are being considered.

Hindustan Computers was incorporated only in March 1978, and began with a desk-top calculator based on the Rockwell PPS-4 chip.

In its first year of trading it did £1.3 million of business and was approaching £5 million by March, 1979. It has been designing its business systems around the PPS-8 chip (CW, June 8, 1978).

Its targets in Singapore are equally ambitious: £1.8 million of business in the first year and over £5 million in the third year.

## Motorway not extended to M4 and M6

COMMUNICATIONS carrier equipment worth over £1 million is to be installed on the M4 and M6 motorways between London, Bristol and Birmingham under a contract placed with GEC Telecommunications for the fourth stage of the Department of Transport's plan to improve motorway display signals and emergency telephone links.

The 270-mile link will have repeaters every 10 miles and will join the network installed by GEC under the first three stages of the plan on the M1, M6 and M62 motorways. It is due to be in operation by the end of 1981.

Control of the signals is effected from mini-computers in each area. A contract was placed two years ago for several Fortran Argus 760s to be added to the initial Elliott 905 system. Police at the control centres enter commands in geographical terms which are translated into codes to be sent to the displays at 30 or 200 bps. The network has been tested to 8,000 bps for possible future upgrades.

## Teleservice from Siemens

SIEMENS has joined the rush by microfranchise manufacturers to rationalise the costs of their support operations by offering users an on-line diagnostic service. Called Teleservice, it is offered to all users of Siemens mainframes running the BS 2000 operating system from Release 4.0 onwards.

The service will be offered from a hierarchical network of

local and regional customer service centres, with the most serious problems referred up to the national centre in Munich.

Under Teleservice, says Siemens, users will have at their disposal the collected expertise of the company's hardware and software specialists, supported by a database of records of previously diagnosed faults, and the appropriate fix.

## Bario managing director

BARIC Computing Services has announced the appointment of Neil John Hopkins as managing director. He succeeds Peter Holland who moves to ICL to take over as director of corporate information systems.

Hopkins has been with ICL since its formation in 1968 and since then has been almost totally engaged in marketing. He transferred to Data'ski's advanced systems sector in 1978, where he was manager.

## French software houses in joint operation

FIVE French software houses have joined to form a private venture Inas-type operation in the US.

The five, GDF Informatique, Eca-Automation, BLS, Sopra and Staria, will open an office in Los Angeles which will collect US market intelligence and provide

a base for support services to assist the members in marketing their software products in the US.

The group will also publish the French products available, but the individual companies will continue to handle their own selling. Other firms may join.

## Pitney-Bowes buys WP firm

A SECOND step into the office of the future business has been taken by mailing machinery maker Pitney-Bowes, in the takeover of Artec, which manufactures small-scale word processors in Palo Alto, California. Pitney-Bowes had earlier bought Dictaphone (CW, January 4, 1979).

Artec, which has cost Pitney-Bowes \$10 million, had a turnover of \$8 million last year. Pitney-Bowes says it is planning to invest several times the purchase price in marketing and manufacturing.

The word processors are to be sold through both Pitney-Bowes and Dictaphone dealers eventually. At present they are marketed in the UK by Data Dynamics, and it is expected that this arrangement will be left unchanged for about a year, at the end of which Pitney-Bowes may decide to sell the equipment through its own UK outlets.

## Three bid for US aviation info contract

THREE US companies are competing for a \$100 million contract from the Federal Aviation Administration to design a computer system to take over flight service tasks currently handled manually. Essentially a viewdata-like information service, the system will provide pilots with weather, flight plans, landing procedures and so forth. The computers will be installed at the FAA computer centre alongside the IBM 9020D air traffic control computers, and linked to VDU's at the flight service centres.

The design contracts have been awarded to Ford Aerospace and Communications group, \$5.6 million; E-Systems, \$3.7 million; and Logicon, \$3.6 million. Each is to design a system, and the contract for implementation is likely to be placed within 15 months. They will specify off-the-shelf computers and write the software.

"The present system currently employs 5,000 people, and we estimate that it will need 12,000 by 1993, so we have to do something to automate it," an FAA spokesman in Washington told

Computer Weekly.

The IBM 9020D's, which do radar and flight data processing, will be due for replacement in five to seven years.

The contract to replace the IBM computers will be one of the biggest offered by the US Federal government, estimated at between \$1,000 million and \$1,500 million. The 9020D's are complexes of 380/50s front-end machines of 380/65s; the machines operate as word rather than byte machines in the application.

The Civil Aviation Authority has a 9020D handling similar tasks at West Drayton, Middlesex (CW, March 13, 1975).

## Burroughs for building society

IPSWICH BUILDING SOCIETY is installing a 324-kilobyte Burroughs B 1855 with 130 megabytes of disc store as the basis for a terminal network to support expansion over the next four to five years in the Ipswich area.

The £110,000 system is to be installed in August to handle investment and mortgage accounts for the society's 25,000 members, replacing the Burroughs L9 and L8 visible record computers it has used since 1974.

## NEWS IN BRIEF

### CDC breach of copyright suit

CONTROL Data is suing two Washington consultants for allegedly using for their own profit parts of a medical appraisal package developed under contract for use on CDC's data teaching system.

The program was to have been used to interview patients to assess their health risks, and the Health Corp and Learning Management Inc were contracted by CDC to write it. Now CDC is claiming breach of copyright.

### Harris acquisition

HARRIS Corp in the US is moving into the telephone switching business with the acquisition of the Farmon Corp of San Mateo, California, a firm which includes digital PBX's in its product line. Harris is paying about \$125 million for Farmon, which has 2,100 employees.

### Effects of Finniston

THE educational implications of the Finniston proposals on the engineering profession are to be the subject of a conference in London on October 15 and 16 under the auspices of the Department of Education and Science. Programme information can be obtained from the IEE at Savoy Place, London WC2.

### Protecting jobs

THE first formal event organised by the BCS specialist group on computers and employment is likely to be a conference in April on New Technology Agreements. Concern was voiced over the recommendations of the Finniston report on engineers: it was thought that if registration schemes were set up it might be necessary to take action to protect the job prospects of computer people.

# Planner rethinks computer trends

JUDGING by Soviet chief planner Nikolai Baibakov's report to the Supreme Soviet last December, this would appear to be a time of re-assessment of future trends in the Soviet computer industry.

According to Baibakov, who apart from being Chairman of Gosplan, the State Planning Commission (Gosplann) has been strengthened and given increased powers of control over the various ministries and their subordinate enterprises. This will itself involve the expansion and updating of Gosplan's computer networks, both for internal planning and optimal investment calculations and for distributed control over local decision taking.

Increased powers are also given to the Academy of Sciences and the State Committee for Science and Technology (SCST) to formulate a 20-year programme (1980-2000) for scientific-technical development, with breakdowns to be continuously checked into 10-year and 5-year plans for both scientific-technical and socio-economic development. It follows that within this government defined framework the computer industry must be giving a great deal of thought to the question of what it ought to look like 20 years from now and

incorporate and adapt to the changes initiated by the Scientific-Technical Revolution. Thus the State Planning Commission (Gosplann) has been strengthened and given increased powers of control over the various ministries and their subordinate enterprises. This will itself involve the expansion and updating of Gosplan's computer networks, both for internal planning and optimal investment calculations and for distributed control over local decision taking.

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by Gerald Segal

The invasion of Afghanistan and the subsequent threats by the US and the UK governments to bar exports of computers and computer spares have brought the Russian computer market under the spotlight. Little is widely known about the Soviet Union's computer population and their uses, so Gerald Segal's summary of the Soviet chief planner's report to the Supreme Soviet on the subject is particularly timely.

reorienting the system to keep pace with the Scientific-Technical Revolution (which, as Soviet leader Leonid Brezhnev recently admitted, it is failing to do).

This year sees the end of the current 10th five-year plan — a dismal end overcast by the failure to achieve the most important growth targets in the fuel, energy, chemicals and machinery industries, and in consequence a targeted growth rate for the year of 2%, which is the lowest since Soviet industrialisation began in the late twenties.

There is also the need to decide on investment policies for the 11th five-year plan (1981-85). The problem now further complicated by the possible long-term embargo on West-East technology transfer arising from the Soviet invasion of Afghanistan. The first sign of this is the US embargo on computer spares for the IBM installations in the Kama River tract plant.

The third problem is the admitted inefficiency of the system; two moves have recently been made to overcome this problem. At the enterprise level a new set of enterprise performance criteria, based upon a new value-added criterion to replace previous gross production, has been introduced so as to link wages directly to the actual output of the enterprise concerned (some complaints have already appeared in the Soviet Press about the consequent need to rewrite computer programs).

At the top of the pyramid the planning system has been reorganised in such a way that hopefully, it will continuously

how to go about achieving the changes.

At the end of last year, according to Dr V. Maksimenko, the deputy chairman of the Main Administration for Computer Technology and Management Systems of the SCST, 3,426 "automated management systems" were operational in the USSR. "AMS" can represent any computerised system from a simple book-keeping operation to a complex distributed data network covering the whole country.

If, however, we make the averaging assumption of three computers per ayatem (and some Russian sources have mentioned such a correlation in the past) we have a total Soviet computer stock of about 10,000, which are likely to be relatively old-fashioned third generation Rjad models based on the original IBM 360s.

Curiously, a year ago the Soviet computer Press reported 3,804 AMSs in the country, which suggests that in the past year some must have been either wound up due to low efficiency or combined into larger units.

Efficiency is unquestionably a problem.

According to Dr A. Baranov, a consultant to the Soviet Communist Party Central Commit-

### The West's share

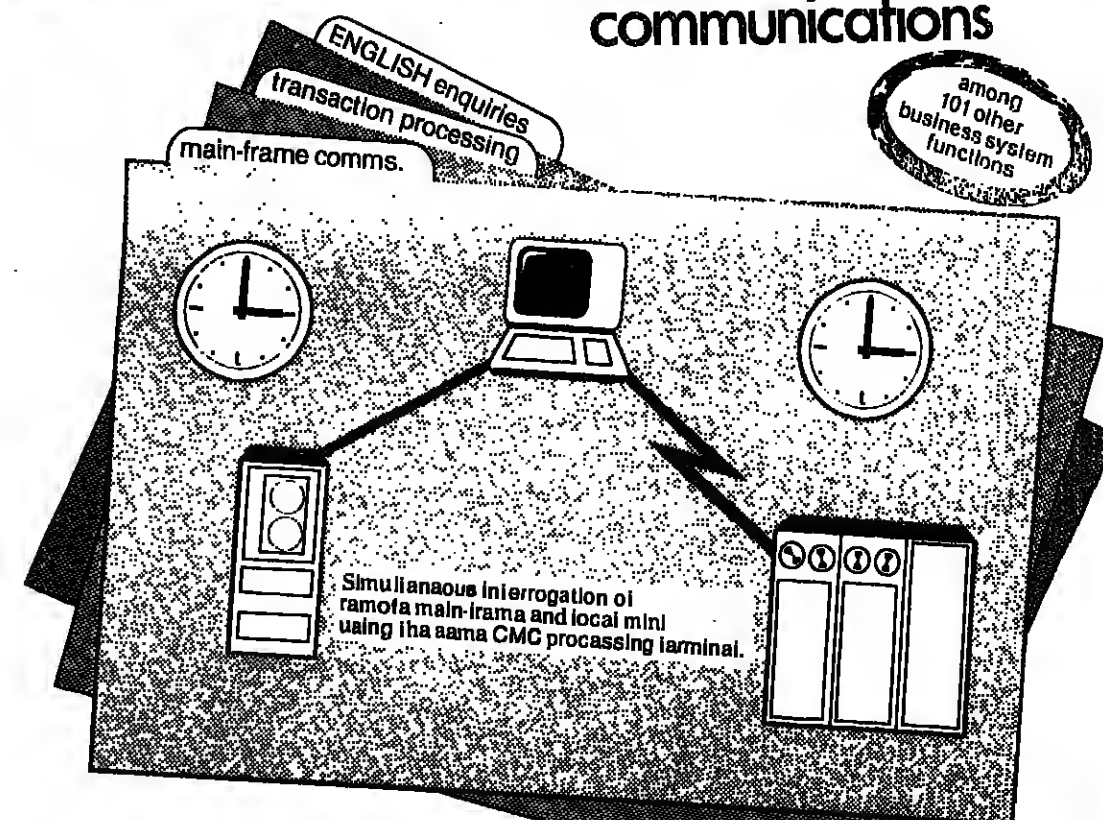
THE population of Western computers in the Soviet Union is estimated at about 820 by Univas. The company gives CII-HA of France the largest share by value, 25%, followed by IBM, 18%, CEC, 14%, ICL, 10%, DEC, 7%, Univac, 7%, Nippon Electric, 5% and others 14%.

## THE SOVIET SCENE



ities is nearing completion, and they should be operational later this year. Four of these bureaux will be extensions of the existing statistical office computer centres in Tomsk, Tallinn, Minsk and Tula, one will be an extension of the Latvian Gosplan's main computer centre at Riga, another, of the Leningrad City's computer centre and the last will be built upon the computer centre currently run in Tyumen by the West Siberian oil and gas administration (Glavtyumen-neftgasrom). The technical base will be two ES-1033s per installation.

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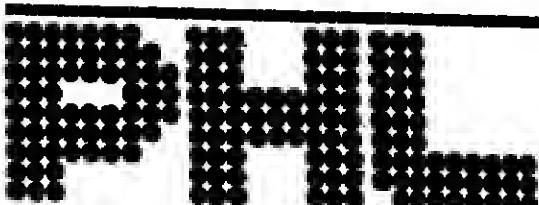
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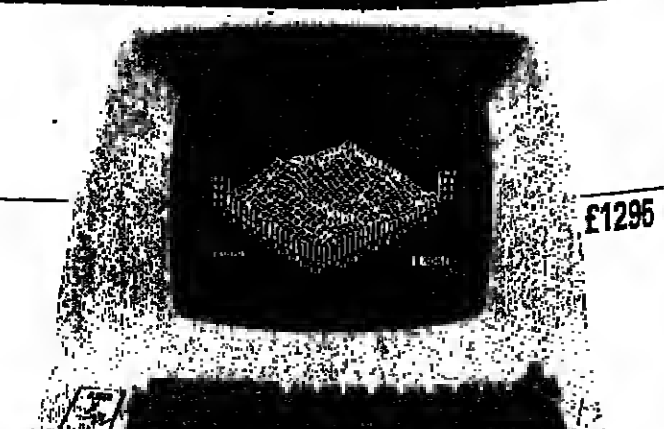
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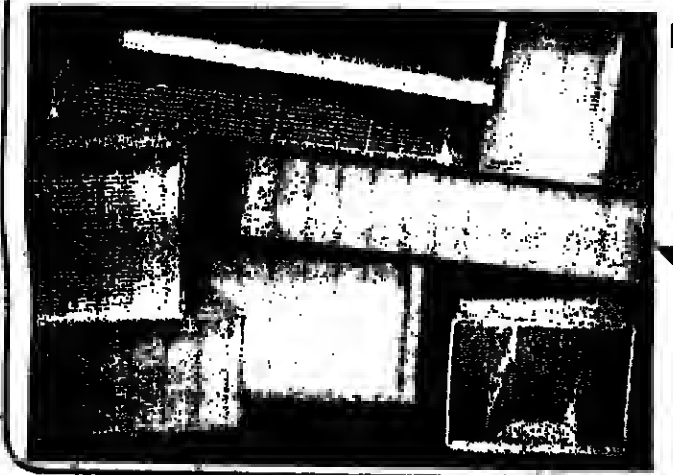
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## PRODUCT NOTES

## 80-megabyte disc system for PDP-11s

FROM Xylogics comes the Model 610 disc system which provides up to 80 megabytes of online disc storage for any Digital Equipment PDP-11 Unibus processor and is resident on one two-sided quad board.

The controller utilises the programmable bit-slice microprocessor technique and is designed on a micro module basis to allow for future expansion to handle 4,400 bpi disc drives with a few ROM changes. The Model 610 is compatible with DEC's RK-11 and RK-05 disc drive controller and cartridge and comes with software support for users of DEC's multi-user time sharing system based on the DIBOL interactive programming language, DIBEX.

It supports up to four 2.5, 5, 10 and 20 megabyte disc drives in all combinations of removable and fixed media.

The Model 610 offers standard position verification compatible with DEC's RK-11 controller and, in addition, an optional 100% position verification. All data transfer instructions contain an implicit seek command.

Separate seek command is provided with the Model 610 to facilitate overlapped seek operation.

Xylogics International Ltd (CW), Lynton House, Mill Lane, Gerrards Cross, SL9 6AY. Tel: 02813 88287.

## Leaflet

A LEAFLET is available from Power Equipment which illustrates the allencer for the Post Office's Type 23B tele machine. The Power Equipment Co Ltd (CW), Kingsbury Works, Kingsbury Road, London, NW9 8UU. Tel: 01-205 0035.

## Desk top calculator

DECIMO has introduced four calculators in its 1880 Series, the CS-804, the DT-720, the ES-340 and the ES-340D.

The CS-804 is a 12 digit desk top calculator with print and display. Its functions include four percentage keys, three total registers, and independent memory.

A slim-line 12 digit print and display calculator, the DT-720 has a number of switchable facilities including rounding, constant, item count, print-off.

The 10 digit model, available in print and display (ES-340D) or print only (ES-340) versions, shares the same specifications.

Decimo Ltd (CW), 4-18 Chobham Street, Luton, LU1 3BS. Tel: 0582 38881.

## Tape formatter to LSI-11 interface

AN INTERFACE for connecting dual standard tape microformatters to the Q-bus of the Digital Equipment LSI-11 is now available, says Arrow Computer Systems.

Made by Distributed Logic Corp (Dilog) and designated the Model DQ130 magnetic tape coupler, the tape interface is compatible with the Pertec dual standard microformatter and equivalents, such as the Tandberg TDF-4050. Tape speeds from 12.5 to 125 inches per second can be handled, says Arrow.

The DQ130 is contained on one quad board which plugs into a signal slot in any LSI-11 based quad system backplane. The microprocessor based coupler emulates the Digital Equipment TMI1 controller and is software compatible with RT-11 and RKS-11 operating systems. This compatibility is retained up to the maximum data rate of 200K-bytes per

second corresponding to 1,600 bpi at 125 ips.

Major functions performed by the DQ130 are buffering and interlocking data and status transfers between the LSI-11 bus and the formatter and generation of all control signals to the formatter such as start, stop, rewind, generate IBG/EOF. Data transfers are via the DMA facility of the LSI-11.

An automatic self-test routine is incorporated in the coupler's firmware with test result indicated by board-mounted LEDs. Other LEDs indicate DMA data transfer status, says Arrow.

The DQ130 costs £1,000 each. This includes diagnostic software, and substantial OEM discounts were available, said Arrow.

Arrow Computer Systems Ltd (CW), Rosamond Tower, Stafford Road, Wallington, SM5 8RW. Tel: 01-647 0962.

A two-page review of some of the latest devices on the market

## Parallel and serial state data analyser

FROM Tektronix comes the Data Analyser which can be used for the state and timing analysis of parallel signals, the state analysis of serial data and for the signature analysis of digital products that are designed for this method of troubleshooting.

The 308 is based on two Fairchild bipolar random access memories which can be used for both serial and parallel data. The device is pictured left.

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To capture information on multiple lines, the 308 can record on up to eight channels simultaneously. In the case of parallel data, the instrument can acquire the data either synchronously or asynchronously.

Several different triggering facilities are provided, says Tektronix. In external triggering mode, triggering could be on up to 15 channels using the optional work recogniser probe. Once data has been acquired and recorded, the 308 can display it in any one of seven state-table or timing diagram formats.

Sample rates of up to 20 megahertz are possible when examining parallel signals and the "latch" mode can be used to capture pulses as short as 5 nanoseconds.

Data set-up and hold times are 25 nanoseconds and zero respectively, says Tektronix. The threshold voltage is variable from -12 to +12 volts and a TTL threshold switch is provided.

If the application involves serial data, the 308 data acquisition can be clocked either internally or externally. If the data is transmitted asynchronously, external clocking for synchronous data can be on either the rising or falling edge of the clock pulse.

Serial data analysis is possible with 5, 6, 7, or 8-bit characters; odd, even or no parity; negative or positive input logic; baud rates from 50 to 9,600; with data or external triggering; and with both parity and framing error recognition.

Keys on the front panel are arranged in groups and colour coded according to function. There is also a self-test feature which comes into operation at switch-on, says Tektronix.

Tektronix (UK) Ltd, Beaverton House, PO Box 69, HRPEN-DEN, Hert. Tel: 0527 63141.

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Consisting of incremental tape transport, formatter, UART interface and function control electronics, the unit can be mounted in a panel, rack or portable case and is complete with function switches.

Operating at baud rates from 110 to 1,200, over 72,000 bytes can be stored on one 300 foot certified cassette. Power drain is said to be less than 55 millamps in standby mode and Model 343CV measures 216 x 121 x 114 millimetres (8.5 x 4.75 x 4.5 inches).

It costs £971 each and OEM discounts are available. Delivery is quoted as five weeks from receipt of order.

Amplicon Electronics Ltd (CW), Lion Maw, Hova, BN3 8RA. Tel: 0273 726718.

## Eraser

THE UV-E PROM eraser uses a high intensity ultra-violet source to discharge up to 14 EPROMS simultaneously, says Microdata, who add that an eight minutes solid state time is triggered automatically by the action of closing the cabinet.

A distinctive audio tone signals the end of the exposure period which can be increased to 16 minutes via an internal switch. UK price is £97, excluding VAT.

Microdata Computer Ltd (CW), Belvedere Works, Milton Way, Pump Lane Industrial Estate, Hayes, Middlesex. Tel: 01-848 8871.

## Change of logo

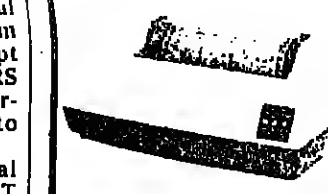
SYSTEMS Engineering Laboratories has changed its logo from SEL to Systems as the old logo could cause it to be confused with other concerns.

New from NEWBURY



Smart micro-based Visual Display Terminal Model 7000/7000C

- Teletype compatible
- 24 lines of 80 characters per line
- Selectable baud rates from 50 to 19,200 baud
- CCITT V24 or current loop interface
- Selectable half or full duplex
- Green phosphor display
- Plus XY cursor address and page mode facility on model 7000C
- Single end user price from £495



Matrix Printer Model 8300

- 125 CPS Printing speed
- CCITT V24 (RS232) interface
- ASCII 96 character set
- 80 characters per line
- pin feed platen
- Single end user price £540

All prices include modem and power cables ready to plug in plus free delivery in UK.

Newbury Laboratories Ltd

Head Office and Sales: King Street, Odham, Hampshire RG25 1NN. Tel: 025 671 2910

Telex: 858815 Sales and Service

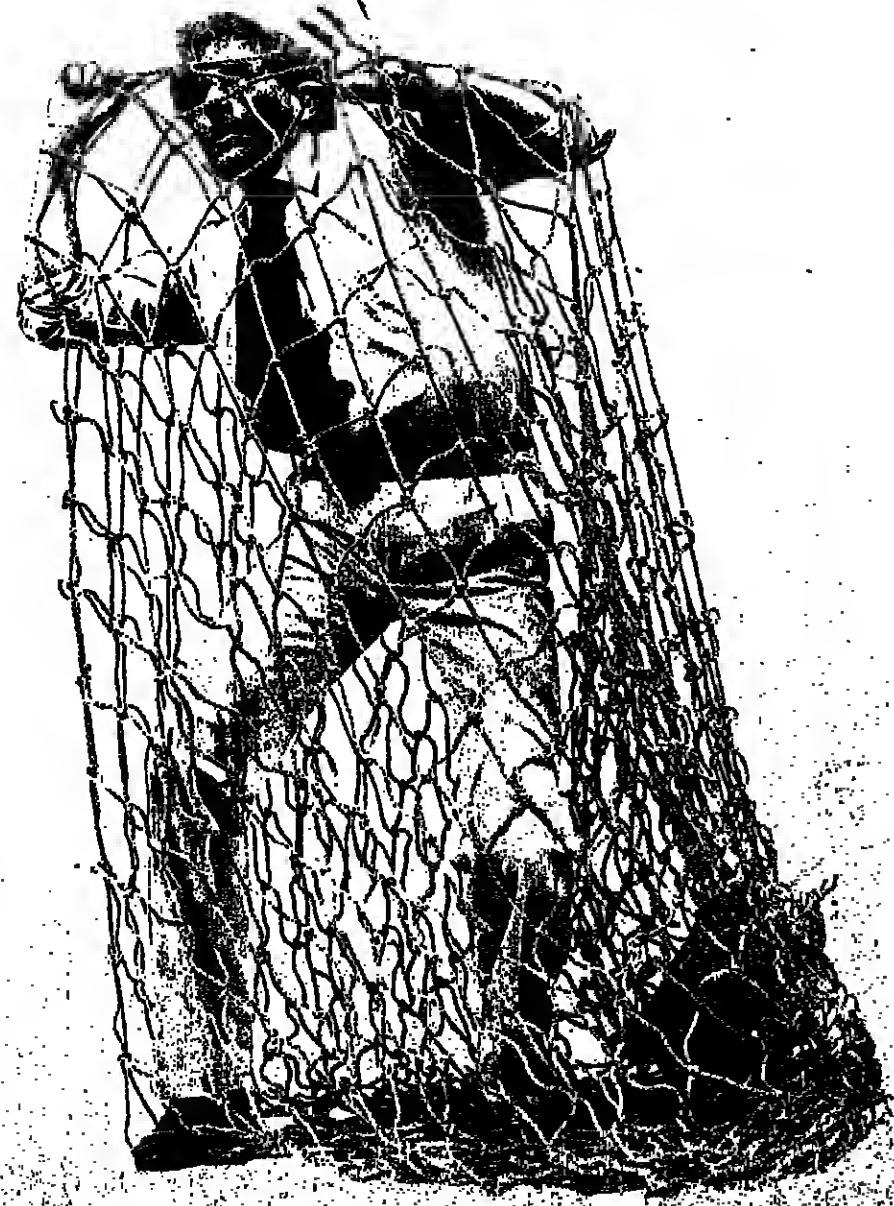
North East Tel: York (0304) 412043

North West Tel: Stockport 061-491 0124

Midlands Tel: Birmingham 021-707 7170

## Looking at large interactive systems?

Don't get caught up in an expensive multilayered software solution.



Interactive computing isn't something you can graft onto a batch hardware or software tradition. It must be designed in. Or you lose time and money. Waiting for delivery or dealing with complex multilayered software that could have you and your programmers in a wrangling tangle.

So make sure the large systems of Digital Equipment. The DECsystems -10 and -20 are on your shortlist. The DECsystems -10 and -20 are thoroughbred descendants of the original interactive computer which was developed and introduced in 1960.

Pelmed. Simplified. Strengthened. Opened up wider to wider in compatibility and flexibility. Currently supporting 60 different languages.

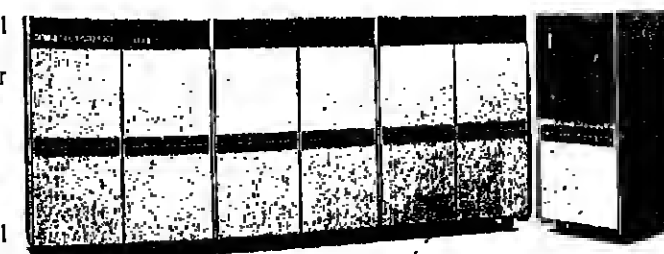
TOPS, an efficient shared operating system that reacts productively from the moment you switch on. Easy-to-use software: user-friendly, guiding and answering.

These are computers designed for the user. Any user — students, scientists, engineers, clerks. As well as for the world's top computer professionals.

Quick to install and get up. No compatibility problems. Free working or terminal choice. Supporting many terminals even in low-priced configurations. Easy to upgrade when demand builds up.

## Evaluate a DECsystem -10 or -20.

Ready to interact at once. Ready to deliver now.



Already at work in hundreds of applications worldwide. Available now in a wide choice of performance ranges.

Made by the No 1 in interactive computing. Put us on your shortlist. Otherwise, you haven't made a true evaluation.

Better still, call us. You won't get any promises, spoken or written. Instead you'll receive an invitation to an immediate, comprehensive demo. No surprises — except the good ones.

Like: easy-to-use software. The hard end fast delivery date we can give you. The price. And how soon a DECsystem can be amortising your investment! Ask any user.

Digital, I'd like a clear picture of how soon and how well a DECsystem could be working for me.

My application is: \_\_\_\_\_

Name: \_\_\_\_\_

Company address: \_\_\_\_\_

Tel: \_\_\_\_\_

Send to: Terry Clarke

Digital Equipment Co. Limited

Digital House, Kings Road, Reading RG1 4HS

digital

No.1 in interactive computing

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OCR Scandata Ltd (CW), Queens House, 2 Holly Road, Twickenham, TW1 4EW. Tel: 01-894 0156.

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The series utilises a 12 inch screen to accommodate 24 lines of 80 upper and lower case characters and a 12 x 10 resolution with a 7 x 10 dot matrix.

Dual intensity allows for differing ambient light conditions, says DDT, and operational modes include self-test, protect and block mode as well as full cursor control with cursor addressing.

A comprehensive selection of functions is standard and up to 80 storage positions are provided with the 920 version. The TVI-912 has 36 keys including function keys and a numeric pad; on the TVI-920 model there are 105 keys which include an additional 16 special action keys plus various timing keys.

Transmission is Ascll synchronous at switch-selected rates in the range 75 to 200 baud, full or half duplex. Interfaces available include RS 232C and TTY 20 millamp current loop, says DDT.

The TVI-912 costs under £600, and the TVI-920 under £700. Prices include site installation and 90 days on-site warranty.

Data Design Techniques Ltd (CW), 12 Leeming Road, Borehamwood, WD6 4DU. Tel: 01-207 1717.

Vax option

SYSTEMS Industry (Europe) has announced a RM780 option, which is said to enable its 0400 RM03 disc storage emulation system to connect directly to the SBI bus on Digital Equipment's Vax 11/780. Typical cost of 286 megabytes is under £20,000, says the firm.

System Industries (Europe), System House, Guildford Road, Woking, GU22 7QQ. Tel: 04862 6077.

Brochure

CODEX has available a brochure highlighting its 6000 family of communications products, called Beyond the Computer.

The 6000 series consists of front end processors which provide 360/370/303X compatibility, intelligent network processors and statistical multiplexers.

Codex Corp (CW), 20 Cabot Boulevard, Mansfield, Massachusetts, 02048, USA.



## PRODUCT NOTES

## 80-megabyte disc system for PDP-11s

FROM Xylogica comes the Model 610 disc system which provides up to 80 megabytes of on-line data storage for any Digital Equipment PDP-11 Unibus processor and is resident on one two-sided quad board.

The controller utilises the programmable bit-slice microprocessor technique and is designed on a micro module basis to allow for future expansion to handle 4,000 bpi disc drives with a few ROM changes.

The Model 610 is compatible with DEC's RK-11 and RK-05 disc drive controller and cartridge and comes with software support for users of DEC's multi-user time sharing system based on the DIBOL interactive programming language, DIBOL.

It supports up to four 2.5, 5, 10 and 20 megabyte disc drives in all combinations of removable and fixed media.

The Model 610 offers standard position verification compatible with DEC's RK-11 controller and, in addition, an optional 100% position verification. All data transfer instructions contain an implicit seek command.

Separate seek command is provided with the Model 610 to facilitate overlapped seek operation.

Xylogica International Ltd (CW), Lynton House, Mill Lane, Gerrards Cross, SL9 8AY. Tel: 02813 88287.

## Leaflet

A LEAFLET is available from Power Equipment which illustrates its silencer for the Post Office's Type 23B telex machine. The Power Equipment Co Ltd (CW), Kingsbury Works, Kingsbury Road, London, NW9 8UJ. Tel: 01-205 0033.

## Desk top calculator

DECIMO has introduced four calculators in its 1980 Series, the CS-504, the DT-720, the ES-340 and the ES-3400.

The CS-504 is a 12 digit desk top calculator with print and display. Its functions include four percentage keys, three total registers, and independent memory.

A slim-line 12 digit print and display calculator, the DT-720 has a number of switchable facilities including rounding, constant, item count, print-off.

The 10 digit models, available in print and display (ES-340) or print only (ES-340) versions share the same specifications. Desime Ltd (CW), 4-18 Chesham Street, Luton, LU1 3AS. Tel: 0582 38881.

## Tape formatter to LSI-11 interface

AN INTERFACE for connecting dual standard tape microformatters to the Q-bus of the Digital Equipment LSI-11 is now available, says Arrow Computer Systems.

Made by Distributed Logic Corp (Dilog) and designated the Model DQ130 magnetic tape coupler, the tape interface is compatible with the Perfec dual standard microformatter and equivalents, such as the Tandberg TDF-4050. Tape speeds from 12.5 to 125 inches per second can be handled, says Arrow.

The DQ130 is contained on one quad board which plugs into a signal slot in any LSI-11 based system backplane. The microprocessor based coupler emulates the Digital Equipment TM11 controller and is software compatible with RT-11 and RKS-11 operating systems. This compatibility is retained up to the maximum data rate of 200K-bytes per

second corresponding to 1,600 bpi at 125 ips.

Major functions performed by the DQ130 are buffering and interlocking data and status transfers between the LSI-11 bus and the formatter and generation of all control signals to the formatter such as start, stop, rewind, generate IBG/EOF. Data transfers are via the DMA facility of the LSI-11.

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It costs £871 each and OEM discounts are available. Delivery is quoted as five weeks from receipt of order.

Amplicon Electronics Ltd (CW), Lion Mews, Hove, BN3 5RA. Tel: 0273 720716.

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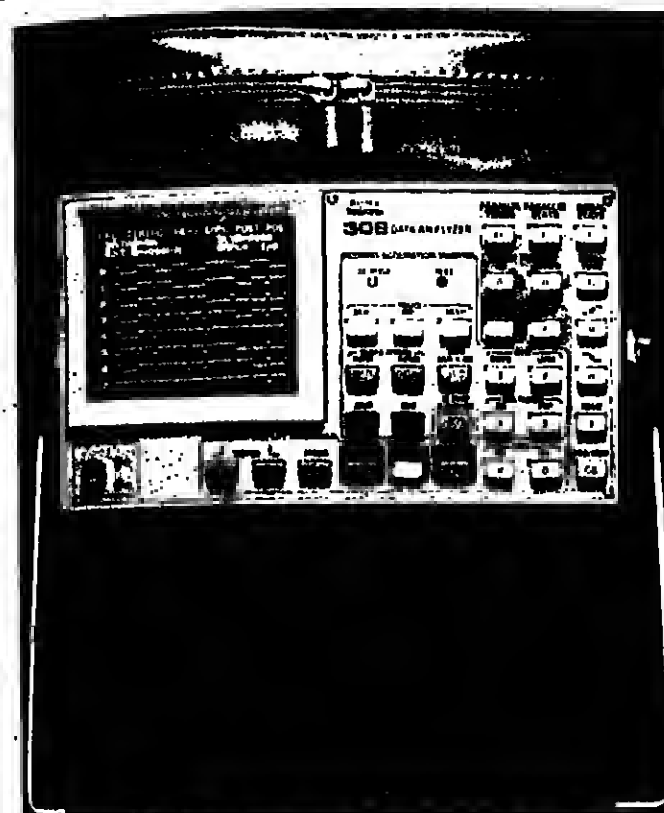
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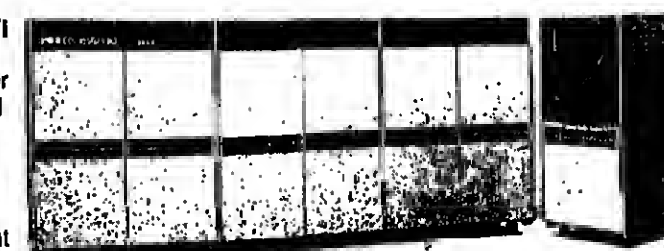
It's an efficient shared operating system that lets you switch on and off software: user-friendly, guiding and easy.

These are computers designed for the user. Any user — scientists, engineers, clerks. As well as for the world's top computer professionals.

Back to install and get up. No compatibility problems. Networking or terminal choice. Supporting many languages even in low-priced configurations. Easy to upgrade when demand builds up.

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Already at work in hundreds of applications worldwide. Available now in a wide choice of performance ranges.

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Like: easy-to-use software. The hard and fast delivery date we can give you. The price. And how soon a DECsystem can be emulating your investment! Ask any user.

Digital, I'd like a clear picture of how soon and how well a DECsystem could be working for me.

My application is:

Name:

Company address:

Tel:

Send to: Tarry Clarke

Digital Equipment Co. Limited

Digital House, Kings Road, Reading RG1 4HS

digital

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Code Corp (CW), 20 Cabot Boulevard, Mansfield, Massachusetts, 02048, USA.

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- Selectable baud rates from 50 to 19,200 baud
- CCITT V24 or current loop interface
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- Green phosphor display
- Plus XY cursor address and page mode facility, on model 7000C
- Single end user price from £495



Matrix Printer Model 8300

- 125 CPS Printing speed
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- ASCII 96 character set
- 80 characters per line
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Newbury Laboratories Ltd

Head Office and Sales: King Street, Odham, Hampshire RG25 1NN. Tel: 025 671 2910

Telex: 858815 Sales and Service

North East: Tel: York (0904) 412043

North West: Tel: Stockport 061-491 0134

Midlands: Tel: Birmingham 021-707 7170





Revell

In 1977 Computer Weekly published 12 articles on Basic File Design by Owen Hanson. This successful series was later published as a Computer Weekly Handbook and proved highly popular with teachers and students concerned with the art of efficient file construction. As a sequel to the basic course Hanson and his colleague Norman Revell have now written a series dealing with more advanced techniques of file design. Aspects of this work to be covered include the optimisation of sequential, indexed and direct files, data security and integrity in batch and real time systems, and the way in which methods developed for conventional file optimisation can be applied to the tuning of databases.

These articles will be self-contained but

related to Basic File Design and readers will find it handy to have a copy available while following the advanced course. A new impression of the handbook will be available shortly at £1.90 per copy including postage and orders should be sent to the General Sales Manager, IPC Electronic Press Ltd, Dorset House, Stamford Street, London SE1 9LU. Cheques/postal orders should be made payable to Computer Weekly.

Hanson and Revell are members of the Business Systems Analysis Division of the City University Business School, London. They were part of the team that developed the Diploma in Systems Analysis and the MSc in Business Systems Analysis and Design that has been offered by the Business School since 1973. Each spent a number of years working for IBM, and they are consultants to IBM in Eastern Europe, and also to a number of other organisations. They have lectured and presented papers in many countries, particularly on systems analysis education; file organisation, design and optimisation; and on database design.

The research aims of the team at CUSO led by Owen Hanson include the provision of a framework of basic theory in file and database design intended to give systems designers the tools required to achieve effective data handling. This work has now been extended to include file design on a large Cromemco microcomputer with hard and floppy discs, and also on the usual mainframes.



Hanson

# Sequential files on magnetic tapes

BY the term "sequential files" we mean that the records in such a file are organised in a meaningful key order, usually ascending. To avoid confusion it is worth pointing out that "serial files" contain records in their order of arrival, and that their key sequence is not in any particular order. The input to a sort program is serial, while the output is sequential.

A great deal of processing is carried out using sequential files, even in these days of inquiry systems and databases. The reasons are these:

1. Many files require every record to be processed on each run. This applies to all update files and is usually true of master files such as payroll, for instance. These high hit-rate files are more efficiently processed sequentially than in any other way.
2. It is cheaper and easier to ensure the integrity of data from unintentional loss or damage if the processing mode is sequential, as against any of the other file design techniques.
3. For most purposes a sequential report is very useful as humans can easily reference information in such a report directly. Thus, when there is no particular need for an inquiry, facility and the record hit-rate is high, the file designer will think first of sequential organisation.

Once it is clear that a sequential file is required, the designer has a choice of storage media. The most usual situation is that tape or disc are available. Sometimes a compromise system such as IBM's 3850 mass storage facility will be used, but this is in effect a direct access device so far as the user is concerned.

The choice is generally magnetic tape. This is because, for high hit-rates, magnetic tapes are usually more efficient. This will be examined in a future article. Also tapes are cheaper — and likely to remain so now that discs with built-in read/write heads are widely used both on microcomputers and mainframes (the IBM 3340 is an example). These Winchester technology discs are usable in poor environmental conditions, but they are far more expensive than earlier discs and have re-established the price differential between the two media.

In magnetic tape handling of sequential files, every record has to be read. Any savings that are possible come from two areas. The first is correct blocking, and the second is hit-rate. If every record is updated already, this second area is not fruitful. Often this does not apply and it is possible to batch or section the file in such a way as to increase the hit-rate.

1. Blocking. The general method described here can be used for any case a designer may have to tackle. In reading several files, a program cannot save time on data records. However, the number of inter-block gaps, or IBGs, that have to be read depends on the blocking factors for each file. The program will only have a limited amount of space for input-output areas. If only one file were in use, its records would be blocked into the largest possible blocks and so reduce the time wasted by IBGs to a minimum. For multiple files both S. J. Waters' and E. S. Walker have developed equations to calculate a minimum total number of IBGs, taking into account:

- S. Main storage space available for I/O areas.
- C. Record length in file.
- R. The number of records in file.
- D. The number of buffers used for file.

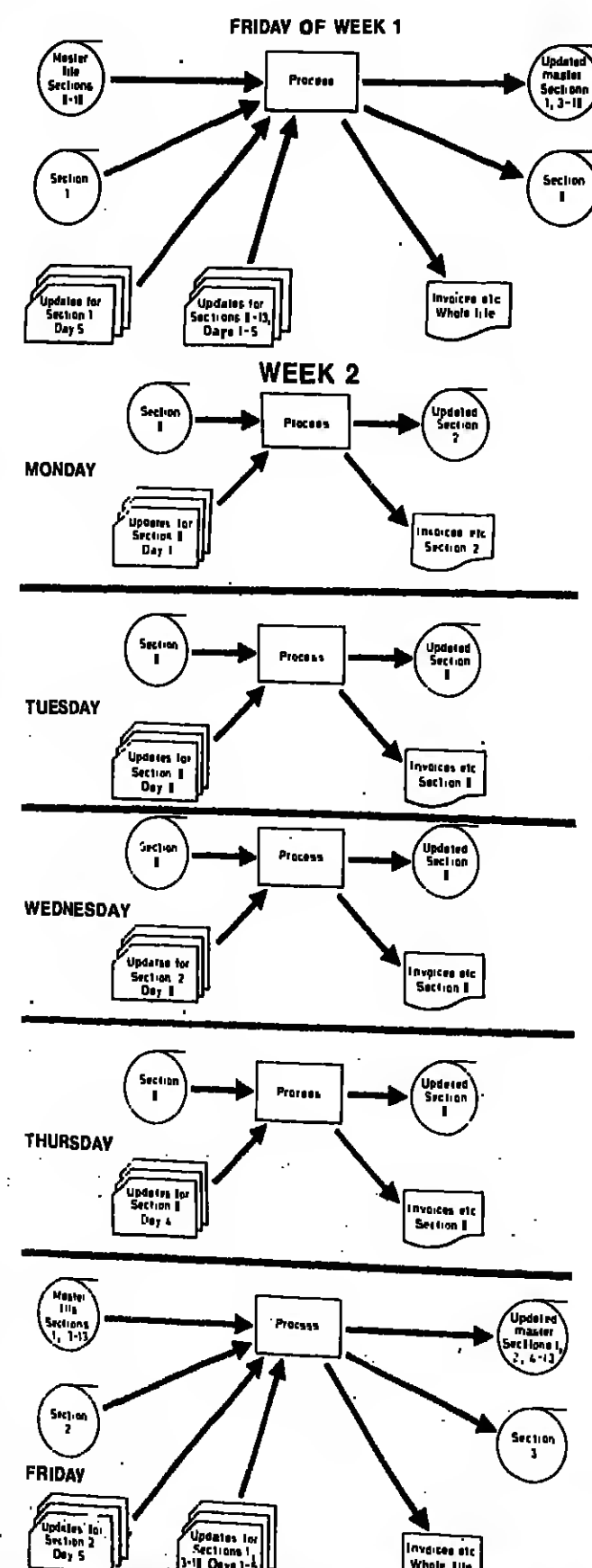


Diagram 1. Updating a sequential file. In the example shown here the active section is processed daily, and a new active section is selected available. This corresponds to a 13-week cycle with daily updates. This technique can be used for any time period and any number of sections.

The general equation is that the optimum blocking factor for file i

$$B_i = S_i \sqrt{R_i / C_i D_i} / \sum \sqrt{R_i C_i D_i}$$

Applying this to a program that updates a master file and records each transaction, with the master, on a ledger, we might have:

Master file	100,000 records of 250 ch
Ledger file	30,000 records of 300 ch
Transactions file	30,000 records of 25 ch

If the program has 5,000 storage positions available and each file is double buffered we get the following results for optimum blocking factors:

$$\begin{aligned} \sum \sqrt{R_i C_i D_i} &= \sqrt{100000 \times 250 \times 2} \\ &+ \sqrt{30000 \times 300 \times 2} \\ &+ \sqrt{30000 \times 25 \times 2} \\ &= 12538.5 \\ B_1 &= 5000 \sqrt{(100000/500)/12538.5} \\ &= 5.84 \\ B_2 &= 5000 \sqrt{(30000/600)/12538.5} \\ &= 2.82 \\ B_3 &= 5000 \sqrt{(30000/50)/12538.5} \\ &= 9.77 \end{aligned}$$

If it were possible to block records into fractional parts, this solution would be optimal and would reduce the number of IBGs due to the three files to 31,440. A Fortran program to calculate optimal solutions for up to six files has been developed by Walker. As fractions of a record are not feasible, Waters suggested truncation which in this case would lead to a figure of 38,334 IBGs.

However, B. J. E. Edwards showed, in an article in The Computer Journal,<sup>1</sup> that truncation could lead to serious errors and suggested the use of a program to search for the optimal integer, i.e. possible, solution.

The optimum in this case is to block File 1 in 5s, File 2 in 3s and File 3 in 13s. Generally the best possible arrangement can be calculated quite quickly using the theoretical optimum as a starting point. In this case extra space is given to File 2, as the figure of 2.82 is near 3. This means that 6.84 has to be reduced to 5, and the space remaining is allocated to File 3, giving a figure of 13.

2. Hit-rate. If this is already at or near 100% no further improvement is possible. If it is not, the designer will look for ways of increasing it.

(a) If update runs are made less frequent, then a greater proportion of master file records will be hit. This is "efficient" in the file processing sense, but may be unacceptable to the user because of the longer wait for results. In this case a possible solution is to look at the pattern of updates.

(b) Analysis of update pattern. If the pattern of updates is either random or unpredictable, no further improvement is possible. Often updates are naturally bunched — meter readings in a single street, sales in an area that has been canvassed etc.

In this case the designer's aim is to separate the inactive sections of the file from the active. The active element being separated, updated and re-combined, with a considerable saving in total run time. The case analysed in Basic File Design<sup>2</sup> reduced weekly run times from two hours 37 minutes to 41 minutes which is typical of the results obtainable by sectioning. The process is shown in Diagram 1 taken from that book.

If the techniques described here are not applicable, or do not lead to significant improvement, the designer should consider the use of direct access storage. This will be considered in Part 2.

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## DEVELOPMENT AREAS

# It's an ill wind that blows nobody any good

STAGNATION and decline rarely create the ideal conditions for stimulating new industrial development in an economy. Yet it is within those areas of the UK which have suffered most from the stresses of the post-war years that the future of our high technology industries would appear to lie.

A paradox perhaps, but one which bears out the cliché that it is an ill wind that blows nobody any good. Successful governments have realised the need to stimulate positive action in those parts of the UK which have been most severely affected by our changing role in the world economy.

With the decline in shipbuilding the North East and North West have been severely affected: unemployment in these regions hovers with monotonous regularity at a level twice the national average.

Other traditional industries have been faced with competition that cannot be challenged effectively with obsolete equipment and small scale operation. Without cautious intervention on the part of the government, the situation could be reached where large areas of the UK fall far behind the rest of the country.

They represent a severe loss of productive resources and

accentuate still further the disparities within an economy as complex as that of the UK.

To analyse the situation is not to find a solution, however: that is a problem which has been with successive governments since before the Second World War.

Changes of government in the UK have brought with them very different approaches to managing the economy. The abolition of what they see as unnecessary public spending is central to the strategy of Conservative administrations, while Labour has used the public purse in an attempt to reverse the fortunes of these twilight regions.

Translated to the level of the individual company, struggling for survival, neither approach may achieve a satisfactory outcome. In the broadest terms, every government since 1945 has adopted the same policy towards the regions, using what can best be described as a "carrot and stick."

Restrictions are applied on industrial development in those areas where employment is acceptably high and little encouragement is required. This stick force expansion into the problem areas, where attractive carrots are available to provide an additional incentive.

In practice, however, the

The decline of the steel and shipbuilding industries and the resulting unemployment have not been taken lying down by the areas affected. A whole new industry has sprung up — that of attracting companies in new fields to replace those closing down — and development authorities now strive to outdo each other in terms of financial and social incentives in their efforts to entice new employers.

In this special Computer Weekly supplement we look at what development authorities in the North, North West, Scotland and Ireland have to offer.

David Casey starts on this page with some of the historical background to the development authorities and describes different government approaches to support for developing areas.

Taking a diametrically opposite view of the situation, the Conservatives have preferred to make tax relief their key incentive, providing substantial capital allowances against tax, for investment in these supported regions. But tax allowances are only worth having if a company can achieve the profits to set them against.

The net effect of these oscillations in policy was disconcerting to the potential investors: the right environment certainly did not exist to attract sufficient capital.

Legislation in 1972 helped to rationalise the treatment of incentives, by providing a more balanced package of grants and tax incentives.

If the gradual movement towards the assisted areas is any indication, this strategy has achieved a modicum of success. Foreign investment is now forthcoming at a realistic rate, although the artificially high level of sterling against overseas currencies has helped to stem the flow in recent months.

If the government really has found the formula for regional revival, this could not have happened at a more opportune time: substantial investments are still required in microelectronics.

With a high value-to-weight

ratio for its output, the computer industry is an ideal candidate to benefit from the incentives wherever they appear most attractive.

Defining the areas which justify central government aid is not easy. Should the emphasis be on those areas which have had a history of high unemployment and social difficulty, or are resources better devoted to regions which are currently experiencing a sharp decline? Unfortunately, the decisions are political by nature: valuable votes may hang on the granting of assisted status to an area.

The first attempt at setting up central regions inevitably led to anomalies. Boundaries were drawn rigidly, with sharply contrasting conditions on either side of an arbitrary line.

For a company whose premises straddled a qualifying boundary, the effects were potentially catastrophic. One part of the factory complex would, in theory, have received the benefits, while there would have been no such stimulus elsewhere on the same site.

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# Ideal base for European drive

DESIGNATING a locality a Special Development Area is not the panacea for all economic ills. The granting of assisted status is only the first step towards promoting the environment in which businessmen are prepared to invest capital and establish a future for their company and its staff.

The intention to move into an unaltered region must be a positive one, rather than a matter of necessity simply because Industrial Development Certificates are being withheld elsewhere in the country.

When Sir Keith Joseph removed many of the restrictions on IDCs, in his regional strategy last July, more responsibility was placed on the deve-

lopment organisations to promote their own region as an ideal area for expansion.

The North of England Development Council is just one of these regional bodies faced with the problem of attracting new capital into a depressed area. In terms of the locality it serves, the council is faced with an enormous task: how to inject fresh industrial life into a region which has seen the decline of its traditional activities and has been depleted further by the mass immigration of skilled workers.

The area for which the council is responsible takes in the five counties of Cleveland, Cumbria, Durham, Northumberland and Tyne and Wear. With Newcastle

the major commercial centre, this region has a population of approximately 3.25 million people.

A justification by the council for the importance of the North of England is the size and value of the market within a relatively short distance of this centre.

Inside a radius of even 100 miles of Newcastle, there is estimated to be a potential market of 18 million people.

With a large part of the development area concentrated on the East Coast the theory is that the North is an ideal base for European operations.

A criterion which should be applied when a company is considering a move to any established region is whether it would be

viable to make the transition in the absence of government assistance.

If the only advantage in moving away from an existing site is that cash grants are available, the view is a short-term one, and one which could have a detrimental effect on the company's own prospects and the economic future of the staff it would be employing.

A major factor in assessing the merits of a move would be the relative labour costs in the two areas. The shortage of highly skilled staff in the North has now forced wage rates upwards, broadly in line with the national average.

But it is in the area of support staff that the North can offer

significant advantages over the regions.

A recent survey of secretarial and clerical salaries by the Alfred Marks Bureau showed that the cost of employing secretaries and shorthand typists in the North was only two thirds of the cost in London, while female clerks were at least 25% less expensive there.

A Department of Employment survey covering all non-manual occupations estimates that employing staff in the North is at least 11% less expensive than in the South East as a whole, and 18% lower than Greater London.

The differential between the North and South is accentuated still further when rents are taken into account. Central London apart, the cost of rented offices in Carlisle or Newcastle would be only half of the rate applicable in the Greater London and surrounding districts.

Underlying a development programme for a region is the need to establish a broad base of industries which should be able to withstand future declines in any one market area.

In this way, the worst effects of a recession can be avoided: no region can afford to have its industrial life decimated every generation.

The assured future of the microelectronics industry makes companies in this sector attractive prospects to be encouraged. Activity in this field is sufficiently labour intensive to justify the scale of grants and localised incentives which are a bait to potential investors.

While much of the microelectronics industry in the UK is centred on London and the South East, there is now a substantial concentration of this type of activity in Scotland.

The North has several established manufacturers of passive components, but most of these companies are planning to expand into the microelectronics field. A current estimate is that more than 7,000 people are already employed in the electronics components industry within the region.

For any microelectronics company attempting to expand into the North, there would be adequate support from the technological institutions. The two universities (Durham and Newcastle), and three Polytechnics, now provide a series of undergraduate degrees covering the whole of the microprocessor field. Links with these academic bodies are maintained through consultants from the senior academic and research staff.

In some instances, the links between industry and the academic life is more formalised. CAP/CPP Ltd has recently formed a microelectronics applications research institute in collaboration with Newcastle University and Newcastle Polytechnic.

Much of the finance for the project is provided by the Tyne and Wear County Council. Part of the institute's activities is to foster the development of applied research and the provision of consultancy and training services.

This "greenhouse" environment has prompted the establishment of several private consultancy and system design companies. They are essentially small organisations which offer the services of a few highly

trained and experienced engineers to work on specialised applications.

For a company attempting to expand within the region, one of its major problems will be to train its own staff. These small scale systems companies could prove invaluable during the start-up period when internal resources are stretched to the limit.

In a geographical area the size of the "North," there are areas which are relatively more prosperous than others. The region therefore contains localities which qualify only for intermediate status, while others attract Development or Special Development Area benefits.

By selecting the area for expansion, with the advice of the development council, a company could secure between one third and a half of its start up costs for a typical electronics or computer project. A substantial proportion of the reservoir of labour is female, and experienced in assembly-type operations.

Since the closure of the Thorn factory at Skelmersdale in 1976, a major blow to the development plans of the New Town there, the Mullard unit at Durham is the only UK manufacturer of TV picture tubes and has been able to employ more than 1,500 people in the area.

In terms of locational factors, Mullard placed great emphasis on the availability of an experienced workforce, used to shift working and assembly operations. The proximity of a major university was a contributory factor in the company's decision to take a site in the region.

Rather smaller in scale is the Littlefuse (GB) organisation. Formed originally as Westington Electronics in 1967, the company was taken over by Tracor, of the US, in 1972.

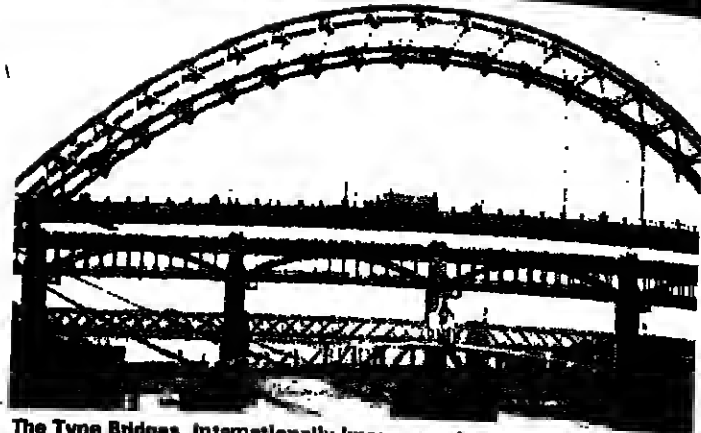
A major supplier of miniature wirewound potentiometers and circuit breakers, Littlefuse entered the microelectronics market in 1977 to supply the special purpose thick film and hybrid microcircuit markets. Satisfied that the region offers the right conditions for growth, the parent company is prepared to expand the UK organisation from its present staff of 80, creating more job opportunities for technologists, engineers and operators.

A third organisation which has found the region conducive to its expansion programmes is Welwyn Electric, a subsidiary of the Royal Worcester Group.

Welwyn moved North in 1947, in the wake of the government's first post-war regional strategy. Now occupying the whole of a 23 acre site at Bedlington, the company manufactures resistors, printed circuits and hybrid microcircuits.

The future of the region cannot be assured by a handful of new companies migrating from the South East: firms representing all sectors of the microelectronics industry must assess the benefits on offer there and the potential that the region offers.

With margins under pressure on the world markets, it is only by cutting costs and increasing effective productivity that many of our embryo enterprises will survive. The North can at least offer the right climatic conditions for these delicate plants.



The Tyne Bridge, internationally known symbol of the enterprise of the Northern Region.

# Firms must believe expansion is possible

TO the average manager based in the Home Counties, the North West of England is probably the last place he would consider when expanding his business.

For him, the North West is synonymous with high unemployment, prolonged strikes and a wholly negative attitude towards working life.

For almost 50 years now, it has been the role of the North West Industrial Development Association to counteract this unfavourable image and promote the region as one in which enterprise can thrive.

Established in 1931, the association is the oldest organisation of its type in the country. Drawing its financial support from a broad base of private and public bodies, it is effectively independent of Whitehall, although there is now limited central government assistance towards the cost of its publicity and promotional activities.

Its principal aim is to help regenerate industry in the region by attracting investment from UK companies and overseas sources. Perhaps its most important function today is as the source of information on the North West, maintaining detailed records of land available for development, transport and specialist labour.

The association's task is certainly not an easy one, in view of the poor performance shown by the region during the past decade. Personnel problems apart, the North West has suffered a decline which has rarely been matched elsewhere in the UK mainland. Unemployment in key districts of the region regularly reaches double figures.

Modernisation of traditional industries has not succeeded: the investment either came too late to prevent other regions from taking the lead, or else world markets for the product fell short of expectations.

The same has been true of the new high technology industries which were attracted to the North West at the beginning of the 1970s.

With much of the new investment concentrated on New Towns, destruction of world markets leaves even these communities vulnerable.

The acute nature of the problems in the North West was recognised when the pattern of regional assistance was reviewed in July last year. With only minor exceptions, the Special Development Areas were unaffected by the changes.

In effect, the incentive differential between the North West and other UK regions increased marginally. Whether this is sufficient stimulus for companies to increase their investment significantly is a matter of opinion.

Among the factors which influence prospective investors are communications within the region. Over the last 10 years, the North West has been transformed by the extension of motorway links throughout the area. The trans-Pennine motorway (M62), connecting with the M6 and M1, has certainly made a major contribution.

Electrification of the major rail links with the South East and Scotland has helped to relate the region more closely to other commercial and industrial centres, so that the movement of goods through the North West is seen as less of an obstacle to expansion.

While improved road and rail links provide a much-needed lubricant to the "economic machine," they are not its source of power. There can only be a revival of the North West's economy if companies can be convinced that expansion there is viable.

For the people in the region, it is vital that the investment is a long-term commitment: training staff in new skills, only to find them redundant within three years, would create more problems than were solved.

The apparent lack of enthusiasm on the part of UK companies to set up base in the North West has not prevented over 600 overseas organisations from taking full advantage of the region's incentives.

Their experience in the region should provide the basis for a more objective assessment by UK companies.

To help it promote the North West more effectively, the association recently commissioned an independent survey of almost 200 foreign-owned subsidiaries of overseas companies located there.

The object of the research was to determine the factors which were important for the companies when they decided to set up operations in the North West, and subsequently, how satisfied they were with the region.

Some 60% of those in the sample had moved into the North West since 1962, while a further 20% could trace their roots in the region for over 30 years.

The companies were predominantly manufacturing organisations on the scale of the small and medium sized units in the UK computer industry, for whom the North West could present ideal opportunities for expansion.

The North West had certainly not been the only possibility open to the foreign investors: half of those which have set up there since 1962 originally considered other areas of the UK.

Of all the reasons for moving to the region the geographical location was the most important. Logically, companies with an established customer base, or existing factories in the area, would wish to move there in preference to other localities.

Respondents to the survey were asked to rate factors as advantages of the North West. While access to transport was the most highly rated, at 80%, the attitude of the labour force was ranked seventh out of the 18 factors, with 59%.

The availability of government grants and incentives was relatively less important, as a feature ranked twelfth, at 55%. Marginally the least significant advantage, with a score of 40%, was the political stability of the region.

No region could claim that it offered only the advantages: the association readily admits that the North West has its fair share of problems. From the viewpoint of the foreign investors, the greatest difficulty was in finding suitably skilled personnel to fill their vacancies.

It is ironic that a situation can be reached in which there are

● Turn to page 28



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## Similar problems, different answers

ECONOMIC instability in a region can rarely be corrected within the lifetime of a single government. If the problem is more serious, and there is decay at the root of the economy, a more drastic approach is required to bring about a permanent and effective solution.

Of all regions in the UK, Scotland and Ulster are the two which require the most radical restructuring if they are ever to regain economic self-sufficiency.

In terms of declining industries and high levels of unemployment, they share the same problems, but the contrasting political environment in Scotland and Ulster calls for totally different approaches to assistance.

The features of the Scottish economy, which provided much of its industrial prosperity during the last century and the first quarter of the twentieth century, were the principal factors in its accelerated decline in between the two wars.

Scotland relied heavily on the traditional industries of steel-making, coal, shipbuilding and heavy engineering, so that the effects of the recession were particularly savage.

To help reverse this sharp decline, the first incentives were offered after the Second World War. The concept was to introduce light engineering to the region, taking advantage of the skills which survived there amongst the unemployed.

By the end of the 1950s, however, it was clear that the strategy was not working: the inertia generated by the post-war boom had not been sufficient to maintain a stimulus to the economy.

The present strategy for Scottish regeneration owes much to the Tothill Inquiry of 1961, which analysed the industrial sectors which could benefit most from the injection of capital.

Almost 20 years later, there is still a serious imbalance within Scotland which must inevitably create strains within other sectors of the UK.

In the first decade after Tothill, almost a quarter of a million jobs were created in Scotland. In retrospect, this influx of employment was not enough to offset the underlying decline in the economy there.

Publicity is given to the electrical and electronic industries which are being established there but the region has a lower concentration in these sectors than other parts of the UK.

The concept of new town development is not a new one: attempts have been made, with varying degrees of success, to establish similar conurbations throughout the UK.

With this experience, five New Towns have been created in Scotland since 1945. Now accounting for 5% of the total Scottish population, they have provided the nucleus for more than 2,500 organisations employing 100,000 people between them.

A significant factor has been that several overseas companies have assessed the risk, and set up their UK base in the New Towns, at Cumbernauld, East Kilbride, Glenrothes, Irvine and Livingston.

But the development of these five localities has not been wholly dependent on the injection of capital from outside the region: sufficient stimulus has been created there for companies to emerge from inside the New Town environment.

One example is Alron Electronics. Founded in 1978, the company is heavily involved in electronic displays for computer controlled processes. Its contact with Irvine had been through the Scottish New Towns Office, the organisation which "markets" the five districts.

In sharp contrast to the modest scale of Alron is the 62,000 square foot factory complex of Motorola, constructed at a cost of \$5 millions and complementing that company's earlier developments at East Kilbride.

While the National Enterprise Board is the primary vehicle for funding government-sponsored developments, a fine demarcation line has been drawn in Scotland, where the Scottish Development Agency takes responsibility for promoting industrial development.

Established by Act of Parliament in 1975, the agency is the largest industrial landlord in Scotland, managing the factory sites which can be let to companies expanding in Scotland or moving there to set up.

A rigid approach to assistance in the region would clearly not have the desired effect on potential investors, so the services offered through the agency are flexible and can be tailored to meet the needs of individual applicants.

As an investor in its own right, the agency can acquire shareholdings in companies for which there might be no other convenient source of funds. Four years ago, the agency purchased Lothian Electrical Machines, a company employing 800 people with an £8 million turnover.

Simultaneously, another electronics organisation, Contronics Techniques, was expanding beyond the capacity of its East Kilbride factory. In this instance the agency provided a secured loan so that a factory could be built on a site provided by it on a long lease.

Any attempts on the part of future governments to provide even more favourable terms for capital grants and allowances in Scotland would be fiercely opposed by Ulster, for whom the preferential treatment meted out by Whitehall provides a vital boost to investment in the region.

A birth rate running far above the national average has done little to ease the employment prospects of the region. Employers have been reluctant to commit funds to Ulster so long as the present political atmosphere prevails there.

Traditional industries in Ulster—shipbuilding, agriculture and textiles—have declined to the point where they provide only 30% of the employment. To the province, this represents a catastrophic reduction in activity.

The strategy of Ulster's Department of Commerce has been to encourage new capital investment.

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## Republic of Ireland's industry is at lift-off point

IN the last 20 years, the computer business in the Republic of Ireland has grown from a handful of people and two computers to nearly 5,000 employed in an industry worth £70 million a year.

All calculations of the size of the Irish computer industry are only estimates, because suppliers still refuse to give out data on numbers of customers. The following estimates, however, are believed to be up-to-date:

- Number of mainframe computers: approximately 160
- Viable, record/business systems: approximately 450
- Small accounting machines: approximately 1,200
- Bureaux (including in-house): approximately 20
- The number of companies using bureaux was 450, but has probably dropped as a result of competition from minis and VRCs
- Installed value of mainframes: £55 million
- Installed value of minis, terminals and other ancillary equipment was £6 million in 1976, probably now well over £10 million
- Total annual expenditure—on hardware, software, personnel and everything else: probably over £70 million
- People in the industry (other than manufacturing): between 4,000 and 5,000

The rapid recent growth has meant a lot of new skilled and professional jobs, which are particularly welcome in a country that in the past was accustomed to exporting half or more of its graduates every year.

The most exciting phase of development may be yet to come, though—the emergence of Ireland as an international centre for hardware manufacture and software creation. This is now being boosted by the microelectronic revolution and the arrival of Mostek in Dublin.

Until recently, the computer industry in Ireland has been essentially a service operation using imported equipment, and adding £10 to £12 million a year to the country's import bill.

But Ireland's energetic Industrial Development Authority, IDA, has in the last few years helped attract a number of significant manufacturing investments from overseas, making the Republic the home of more new computer manufacturing activity than any other country in Europe. To give some examples:

- Amrah recently opened its first European factory near Dublin.
- Nordor is developing a £5 million manufacturing centre at Brey, near Dublin.
- Data 100 makes its remote batch terminals in Cork.
- Data Products, which has been making core memories in Ireland since 1968; also produces line printers.
- And the biggest investment of all is Digital, producing its minicomputers and peripherals at Galway. DEC now employs over 1,200

people, and sources three-quarters of its European hardware orders from Galway. Recently, the company opened a second Irish factory, at Clonmal.

The pace of new manufacturing investment shows no sign of slackening. Computer Automation (the third largest US mini manufacturer) has decided to put its European production centre into an IDA advance factory in Dublin—bringing to almost 70 the number of electronics companies to locate in Ireland in recent years.

Computer Automation will produce its complete range of minis, components and systems in Ireland. The biggest recent success story, however, has been Ireland's luring Mostek away from settling in the UK.

Overseas firms have chosen Ireland for a variety of reasons: political stability; for the American companies, a common language; and the IDA's array of financial and other incentives.

For manufacturing companies, the most important IDA incentive has until recently been export profits tax relief, which means that computer and other firms exporting all their production from Ireland are completely free from tax on their profits until 1990.

And from the beginning of 1981, a potentially even more attractive incentive comes into effect—a top rate of 10 per cent Corporation Tax, which will be much the lowest in Europe, and which will apply until the year 2000.

Spin-off from computer manufacture has created related businesses in Ireland, and the IDA runs a successful subcontracting service to help new companies find local suppliers and subcontractors.

Importers include the English sheet metal company Southborough, which makes cabinets for computer systems. It opened an engineering centre in Meath to supply the burgeoning Irish computer business.

New blood has been evident in the software field too—for the IDA incentives apply to software equally as to hardware. And training grants are specially significant to software companies.

British computer software houses already in Ireland include Altego and MSP. Overseas firms include Comtech of Canada and Samson Automatisation of Holland. Significantly, all of Samson's Irish output of application software is earmarked for export to West Germany, Austria, Scandinavia and even to the parent company's home market in Holland.

Software companies are particularly welcomed by the Industrial Development Authority, because of their high proportion of graduate employees. In summary, Ireland's computer industry is at lift-off point. The rapid growth of the last few years may pale into insignificance with the growth that lies immediately ahead, for quite apart from the export-oriented work, Ireland's internal

data processing needs are going to expand quickly.

The country will probably have the highest rate of GNP growth among all the EEC countries this year (as it did in the past two years). It will also have the fastest growth in manufacturing output.

Who knows? The computer industry may be instrumental in finally halting Ireland's brain drain, and starting a reverse flow of skilled professional talent back across the Irish Sea.



Precision welding at the Kells, Co Meath, factory of Southborough, a British sheet metal company, one of the many firms taking advantage of the electronics industry's dramatic growth in Eire.

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The InterCity 125 provides a high-speed link between London and the North East.

## Scotland and Ulster need new answers

● From page 28

estment (and with it, the creation of job opportunities) while diversifying the basis of the region's economy.

Only by maintaining a differential over the other assisted regions of the UK can the department hope to attract new funds into this potentially high-risk area.

For capital grants, Ulster can offer between 30% and 50% of the cost, compared with 22% in the Special Development Areas on the mainland. Capital grants are independent of the number of new jobs created.

For manufacturing projects based in Ulster, additional benefits can be tailored to the needs of individual applicants; so great is the need for employment opportunities.

Assistance is fine-tuned to direct the inflow of funds to those districts where the problems are most acute. By way of tax concessions, profits earned in Ulster are treated exactly the same as on the mainland.

The size of a grant awarded does not affect the eligibility for writing down capital values against profits so that, even where the full 50% grant is payable, the company can offset the whole of the capital cost against the profits for the year (by claiming 100% first year allowance).

But to take full advantage of the tax concessions, there must have been profits generated; there is an additional stimulus to profitable operation.

So long as the political climate of Ulster remains precarious, Whitehall will support the region's economy. In practical terms, rented factory accommodation is made available through the department at subsidised rents, which are as low as 40% of those on government premises elsewhere in the UK.

For companies with growth potential who do not want to be committed to purchasing a site which they might outgrow, this rental option is a valuable incentive.

Three schemes operated in the region are particularly relevant to the electronics and computer industries contemplating a move there.

Recognising that a shortage of skilled labour would deter these high technology industries from moving there, the department

sets up integrated work force training units (IWFTUs) in areas where unemployment is unacceptably high.

The government provides a small factory, equips it, and supplies the trained instructors to handle a dozen or more workers at a time.

In practice, the success of the "small business nursery" has prompted local businessmen to take over these experimental factories as the nucleus for their own expansion programmes.

Broadly comparable with its counterpart in Scotland, the Northern Ireland Development Agency supplements the grants and incentives offered by the Department of Commerce.

A "lame duck" approach to companies in Ulster would do nothing to solve problems, so wholly commercial criteria are applied by the agency when assessing grant applications.

The agency has legal powers to acquire investments in companies, provide loans, or set up joint companies with private enterprise.

Equally important to a firm embarking on a venture in Ulster is the recruitment of management and the avail-

ability of impartial advice. Through its own "resource bank" the agency can provide this support and is able to assist with management selection.

For the smaller scale firm, the local enterprise unit provides a comprehensive package of incentives. In line with the diversification policy, the unit has been encouraging electronics and computer companies to set up in Ulster.

It sees its role as being rather more than a catalyst which acts as a company on its way, maintaining a relationship with the new firm as it develops.

This close working knowledge of the firm ensures that the most appropriate facilities are available as the need arises; there are examples on record of companies being assisted in four or more different ways by the unit; through grants, employment subsidies, offers of factory accommodation, and the funding of stocks.

Provided that Ulster can maintain its differentials over the rest of the UK, the momentum which has been slowly gathering over the past decade should enable the region to rebuild a more stable economy.

## Firms must believe expansion possible

● From page 28

more vacancies than people unemployed, yet relatively few of those jobs can be filled.

Confounding the popular image of the region, only one in seven of the companies in the sample identified labour relations as a problem. Indeed, only one organisation had experienced a strike.

An insight to the North West was revealed when the companies made comparisons between conditions in the UK and their home countries. The total cost of labour, specific wage costs and the cost of premises were all significantly better in the region than overseas.

Material and production costs in the UK showed some benefits, while days lost through industrial action were in line with those in the home country.

The saddest reflection on the labour force, however, was that only 8% of the companies questioned felt that productivity was higher in the UK than at home. Absenteeism fared little better.

Perhaps the most significant conclusion to be drawn from the survey was that two thirds of the firms in the sample were planning to expand their business either on an existing site, or elsewhere in North West.

A further 21% were sufficiently encouraged by their experience to expand, albeit elsewhere in the UK.

Developing a region is rather more than building roads and offering cash grants. If this is the only basis for the revival, the area becomes excessively dependent on the flow of funds from Whitehall.

A more constructive approach

## Ill wind can blow somebody some good

● From page 23

"Areas" and "Intermediate Areas" into the unassisted regions, the contrasts have been made less severe, with the result that assistance can be "fine-tuned" to meet the precise needs of a region.

In an attempt to reduce public spending after taking office last year, the present government made two changes to the pattern of assistance. Grants are being progressively reduced in all but the Special Development Areas and the boundaries for the assisted areas have been redrawn.

The effect has been to downgrade several localities by at least one "rank," so that areas may become less attractive to the prospective investor. The capital grant of 22% for plant, equipment and premises in a Special Development Area (SDA) stays unchanged in Sir Keith Joseph's programme.

Formerly, a Development Area offered comparable grants, but the amount of this assistance is being reduced to 15%. More stringent than this have been the revisions to the Intermediate Areas, where the 20% capital grant (which applied only to premises) is being phased out by the middle of this year.

While the cash grants are being applied more selectively, tax concessions can still be claimed at the same level irrespective of the company's location. For most types of capital investment, a full 100% of the value can be written off in the first year of use, with the right to claim a smaller fraction if profits are insufficient to take full advantage of this concession.

Whatever value remains unclaimed is added to a capital pool which is progressively written down at 25% per annum on the reducing balance.

Joseph made the incentive carrot somewhat smaller last July, but also took some of the sting out of the stick. Within the non-assisted areas, the minimum size of factory site which requires an Industrial Development Certificate has been raised from 15,000 square feet (12,500 in the South East) to 50,000 square feet. An IDC — permission to build within a non-assisted area — is no longer required for expansion within Intermediate Areas.

# Appointments

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# Appointments



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**ANALYSTS/PROGRAMMERS** with a good knowledge of IDMS and COBOL required to develop new ON-LINE projects.

**SENIOR PROGRAMMER** with INSTRUMENTATION or PROCESS CONTROL experience. Knowledge of RMX 80 multitasking operating system and/or ISIS II advantageous. Hardware INTEL 80/80.

**SENIOR ANALYST/PROGRAMMERS** with a sound knowledge of COBOL and ASSEMBLER.

**TECHNICAL AUTHORS** with a knowledge of TELEPHONY and MINI hardware.

**ANALYST PROGRAMMERS** with a sound knowledge of PL/I and ASSEMBLER.

Outlined above is a selection of current requirements. Space and time make it impossible to list all the opportunities available. Therefore, if you would like to work overseas and for a highly-respected service company, please telephone or send your career resumé to me because I may well already have an excellent opportunity to offer you.

PLEASE WRITE OR TELEPHONE NOW

Ann Arledge, Marketing and Recruitment Director  
Industrial Artists (Hitchin) Limited, 21 Bancroft, Hitchin, Herts.  
Tel: (0482) 52741/2/3 (Day) or (0482) 700701 (Eve/Weekends)

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## SYSTEMS DEVELOPMENT SUPERVISOR

IMI Enote, who manufacture and market an extensive range of pneumatic control equipment and tube fittings, are seeking a Systems Development Supervisor to lead a small development team. The company is highly computerised, using modern on-line techniques on both mini and mainframe computers.

Suitable applicants should have at least 5 years programming, design and team leading experience plus a good academic background. Experience in on-line systems, mini computers and large IBM mainframe is desirable.

Promotion prospects for those with drive and skill are good both within Enote and the whole IMI group of companies.

Applications from men and women to the:

Personnel Department, IMI Enote Limited, Eastern Avenue, Lichfield W813 6BB. Tel: Lichfield (042) 54151.



## CAN YOU PROGRAM IN MK IV?

If so we can offer you the opportunity to

- Gain rapid responsibility for part of a large accounting system
- Work on an IBM 370/158 under OS/VS
- Use your MK IV programming skills to the full
- Become involved in systems design
- Earn a commencing salary at up to £7,000

To find out more about this position telephone Craig Thrussell on 01-628 8088 Ext. 383, or write to him at



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## MYRIAD

## ADVANCED REAL-TIME COMMUNICATIONS SYSTEMS DEVELOPMENT

### SALARIES TO £9250

### BERKSHIRE

We are recruiting a number of additional real-time System Programmers/Designers to enhance our client's Software Development Team and to work on an exciting range of new projects.

The company can offer involvement in the following:

- ★ Real-Time control software development
- ★ Advanced communications systems design
- ★ Packet switched networking
- ★ Project Team responsibility
- ★ Mini and micro-processor involvement
- ★ Extensive training to the highest standards

If you can offer one (or more) of the following:

- ★ PDP11, Macro-11
- ★ RSX11-M
- ★ Z80/8080 micros
- ★ Micro-assembler
- ★ Process control experience
- ★ Data communications

As a part of one of Britain's most successful private organisations our client is the unchallenged leader in its field and is committed to extensive ongoing development in order to retain this enviable position. For the successful candidates, therefore, the rewards are high, including: excellent starting salaries, relocation expenses where appropriate, five weeks' annual leave, comprehensive pension and life assurance scheme, and real opportunities for progression and career development.

Ref: SW2/0702/CW.

## SEVENOAKS, KENT Programmers and Analyst/Programmers

These positions, arising from ongoing expansion of our client's International Systems Centre, are ideal opportunities to join a progressive installation based in an attractive part of rural Kent. The successful candidates will work within a project team and should have the ability to work on their own initiative in a development environment.

The People:

- Analyst/Programmers:
  - 3 years' COBOL gained on any mainframe
  - some previous experience of analysis/design
- Programmers:
  - 2 years' COBOL gained on any mainframe

The company is a major multi-national with diverse interests throughout the energy industry. Their modern, well-equipped offices in Sevenoaks house the data centre which provides a similarly

IBM 3031

4Mb

MVS

TSO

IDMS

SHADOW

COBOL

diverse range of computing services to users throughout Europe, making extensive use of powerful on-line facilities.

The Rewards:

- Analyst/Programmers c. £6750
- Programmers c. £6000
- Full review May 1980

- First-class career development allied to a progressive training program
- Flexitime
- Comprehensive pension and life assurance
- 100% relocation expenses where appropriate
- Excellent sport and social activities

Ref: SW1/0702/CW

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**LEEDS/BRADFORD AREA****ANALYSTS**

(DR/512) 4 - years (including programming background) c £7000  
 (DR/513) 2 - years financial systems - IBM site to £7000  
 (DR/514) 2 - years commercial systems c £6500  
 (DR/515) 18 - months (plus programming background) to £6500

**PROGRAMMERS**

(DR/516) 2 1/2 - years COBOL c £6000  
 (DR/517) 12 - months IBM COBOL £ Neg.  
 (DR/518) 2 - years COBOL on any mainframe c £6500  
 (DR/519) All levels POP BASIC to £8000  
 (DR/520) 18 - months ICL COBOL - 2900 site to £6500  
 (DR/521) 12 - months COBOL on any hardware to £6500  
 (DR/522) 2 - years NCR COBOL £ Neg.

**SOUTH YORKSHIRE AREA****ANALYSTS**

(DR/523) 3 - years commercial systems c £6000  
 (DR/524) 2 - years (with programming background) to £6000  
 (DR/525) 2 - years commercial systems £ Neg.

**PROGRAMMERS**

(DR/526) 2 - years ICL COBOL c £6000  
 (DR/527) 3 - years COBOL on any mainframe to £6250  
 (DR/528) 3 - years ICL COBOL to £7000

**TYNE & WEAR AREA****ANALYSTS**

(DR/529) 18 - months commercial systems to £6500  
 (DR/530) 2 - years financial systems to £7250  
 (DR/531) 3 - years manufacturing systems c £7500

**PROGRAMMERS**

(DR/532) 2 1/2 - years COBOL on any hardware c £5500  
 (DR/533) 12 - months IBM COBOL £ Neg.  
 (DR/534) 3 - years PL/1 c £6500  
 (DR/535) 2 - years IBM COBOL to £6500

**NORTH EAST AND YORKS CONTACT: CATHY SCOTT****LIVERPOOL AREA****ANALYSTS**

(DR/536) 12 - months IBM site c £6500  
 (DR/537) 18 - months IBM environment to £6700  
 (DR/538) 18 - months any machine background to £7000  
 (DR/539) 18 - months financial environment c £7000  
 (DR/540) 18 - months general d. p. background c £7000  
 (DR/541) 18 - months any mainframe to £7500

**PROGRAMMERS**

(DR/542) 12 - months any IBM experience to £6000  
 (DR/543) 12 - months any mainframe to £6000  
 (DR/544) 18 - months IBM COBOL and/or PL/1 to £6000  
 (DR/545) 18 - months IBM background to £6500  
 (DR/546) 18 - months ICL environment to £6500  
 (DR/547) All levels ICL COBOL to £7000

**MANCHESTER AREA****ANALYSTS**

(DR/548) 12 - months IBM background c £6000  
 (DR/549) 12 - months ICL site c £6500  
 (DR/550) 18 - months any environment to £7000  
 (DR/551) 18 - months ICL site to £7000

**PROGRAMMERS**

(DR/552) 12 - months ICL experience c £6000  
 (DR/553) 12 - months Burroughs environment to £6500  
 (DR/554) All levels IBM COBOL and/or ASSEMBLER to £7000  
 (DR/555) 18 - months IBM environment to £8000

**NORTH WEST CONTACT: EDWARD BRUSH**

Interested? Send coupon FREEPOST or phone quoting relevant reference.

NAME \_\_\_\_\_ AGE \_\_\_\_\_  
 ADDRESS \_\_\_\_\_  
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 PHONE HOME \_\_\_\_\_  
 BUSINESS (will be used discreetly) \_\_\_\_\_  
 YRS ANALYSIS \_\_\_\_\_ YRS PROGRAMMING \_\_\_\_\_  
 MACHINES USED \_\_\_\_\_  
 JOB SOUGHT \_\_\_\_\_ REF No. \_\_\_\_\_  
 SALARY \_\_\_\_\_ SALARY REQUIRED \_\_\_\_\_ CW/9/2



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Dorsal House, Slomford Street, London SE1 9LU.

Published by IPC Electrical Electronic Press Ltd.

## Shift Leader

c.£5,750+ S.A. New Installation-Wembley

This rapidly expanding book end record club is to take delivery of an IBM 4331 in April. The system will operate under DOS/VSE with POWER/VSE and CICS to run a sophisticated on-line system.

We require a Shift Leader with at least 2 years relevant IBM experience, and the ability to assist in setting up the new computer room as well as lead a team of Operators.

Starting salary will be in accordance with experience and subject to review in July A

generous package of benefits will be further enhanced by training, and excellent prospects for advancement as the function develops. For further details please contact Chris Bird, Operations Manager.



**The Leisure Circle Ltd.**  
 York House, Empire Way,  
 Wembley, Middx. HA9 0PF.  
 (Tel: 01-902 8888)

UNIVERSITY OF  
NEWCASTLE-UPON-TYNE**ADMINISTRATION  
PROGRAMMER**

The University Administration is currently transferring its existing computerised systems on to a new computer which is based on a PDP11/34 processor. The systems are being transferred to the new computer at the end of the year. The new machine will have the capability of the new machine. Applicants should ideally have experience of Digital Systems operating under RSTS/E and BASIC PLUS. The appointment will commence as soon as possible and will be for a period of two years.

The salary will be at the appropriate point on the Administrative Grade 1A scale, £4,025-£5,785 (from 1st April, 1980) according to experience and qualifications. Membership of the appropriate University superannuation scheme will be required.

CHELSEA COLLEGE  
University of London

## A SENIOR COMPUTER OPERATOR

is required to lead two shift operations in the Computing Centre. The Centre operates a new Harris 125 interactive multi-access computer with 24 ports under the VULCAN operating system. This system will be upgraded over the next two years to replace the existing Elliott 4130 mainframe system.

A responsible and well educated person is sought with a minimum of 'O' level Maths, and English and preferably a technical background. The post should also appeal to technicians with mature experience of laboratory computer and electronics as an alternative to maintenance operating experience.

Conditions of appointment include a five day week, 4 weeks' holiday, plus one week at both Christmas and Easter including the Bank Holidays; two shift working only (to 11 p.m.) and salary up to £5,423 p.a. inclusive.

Interviews by arrangement with Secretary, Computer Centre, Chelsea College, Fulham Broadway, London SW6; Tel: 01-736 1244.

Derby Lonsdale College  
of Higher Education**PROGRAMMER/  
ANALYST**

(Full-time or Part-time)

to work on SYSTIME 8000 and SYSTIME 1000 computing systems operating under RSTS/E and RJE.

Salary Scale:  
 Full-time: £4,544-£5,087  
 Part-time: £2,400 p.a. max

Application forms and terms of reference from the Secretary, Derby Lonsdale College of Higher Education, 100, Lonsdale Road, Derby DE1 3JF. Tel: 0332 471111. Closing date: 28 February 1980.

# PROGRAMMERS

**BASIC + PROGRAMMERS**

City/Weest End

£5000 + with Subsidised Mortgage

A number of our clients in publishing, banking and hardware manufacturing currently have requirements for BASIC + Programmers with two years' experience. Working on commercial applications and technical support, these opportunities offer substantial fringe benefits, including subsidised mortgage, profit sharing, season ticket loans and health schemes.

Ref: IM 6/1

**COBOL — PLI PROGRAMMERS**

Based Weest End

up to £7000 + House Purchase Scheme

A major commercial organisation is seeking programmers with a minimum of 6 months' experience. There are unlimited opportunities for personal development across a wide range of applications. Overseas assignments are also available.

The Company offers assistance with house purchase, interest-free season ticket loans and free health insurance.

Ref: IM 6/2

**SENIOR SOFTWARE PROGRAMMERS**

City

up to £9000

Our client is an international service organisation of high repute. Using DEC equipment, successful candidates will work on communications and/or database systems. At least three years' experience in one or other of the above fields is necessary.

Excellent benefits include a staff restaurant and generous annual leave.

Ref: IM 6/3

**IBM PROGRAMMERS**

Central London

c£7000

A well-known Insurance House urgently requires IBM 370 Programmers with Assembler or Cobol experience. Knowledge of using CICS or any other TP Product would be an advantage. The projects are all in the development stage and will suit programmers anxious to move away from maintenance work. Benefits include an excellent SALARY, FREE BUPA, SEASON TICKET LOANS AND LOW COST PENSION CONTRIBUTIONS.

Ref: DB 6/4

**PROGRAMMER/ANALYST**

City

to £10000

A Company dealing in Raw Products, in Central London requires a self-starter for this UNIVAC 90/30 installation. The applicant must be self motivated and dedicated. He will have a minimum of 4 years' experience which ideally will include applications for a real time environment. User liaison will be part of the job. In return, the company offers a high SALARY, FREE LUNCHES, SEASON TICKET LOAN.

Ref: DB 6/5

**COMPUTER MANAGER**

(Analyst / Programmer)

City

to £8750 + BONUS

This Central London firm in the commodity markets is looking for a MANAGER who is flexible and adaptable. The applicant must have at least 18 months' RPGII experience to lead their small team. A knowledge of 2900 machines COBOL and handling of on-line equipment would be an advantage. Benefits include Bonus guarantee to be at least 5%, very generous luncheon allowance and Non-Contributory Pension.

Ref: DB 6/6

# OPERATIONS

**IBM 370 DOS SENIOR OP.**

2 yrs + DOS experience for London installation running a 370/138. Some supervisory experience preferred. 2 shifts only.

to £8500

**IBM 370 DOS OPERATOR**

Financial organisation requires an operator with 18 mths + experience including some JCL knowledge. All banking perks offered including cheap mortgage.

£5500

**IBM 3031 DOS SHIFT LEADER**

3 yrs + DOS experience with good JCL and supervisory experience for 2 shift working London installation.

£5600

**IBM 370 OS DEP. SHIFT LEADER**

Asst. S/LOR/network controller with 3 yrs. + OS experience and some telecomm. knowledge required by large C. London site. Interesting position which involves some shift work and some days only work.

to £7200

**IBM 370 OS OPERATOR**

18 mths + experience required by London Financial organisation, good career path and excellent perks including subsidised mortgage.

£6000

**IBM SYS 3 OPERATOR**

City-based installation requires SYS 3 operator to work days only initially, but to go on to a 3-shift system when their new machine arrives later this year. Good prospects + perks.

£5000

**ICL 1800 OPERATOR**

North London installation requires an operator with 18 mths' ICL experience. Opportunity to learn new range later this year.

£5200

**ICL 1800/2800 OPERATOR**

Large C. London installation requires experienced ICL operators. Unusual shift pattern in operation gives longer than average holidays and excellent perks are offered.

£4700

**OPERATIONS MANAGER**

Large international company requires OP professional with at least 6 years' experience of Burroughs medium mainframe systems and proven staff management abilities to run operations and data entry desks.

to £10000 + CAR

**BURROUGHS 6700 OP**

Large company in Southern England require operator with minimum 18 months' experience to work 3-shift system. Benefits include free Life Assurance.

£6000

**BURROUGHS MCPV OP**

Large installation in City require operators with at least six months' experience, good career prospects.

c£5000

**DEC PDP OP**

Preferably with DEC experience to work 2-shift system at medium-sized installation in S.E. London.

c£5300

**SYSTEM ASSURANCE DAYS**

A challenging days-only job for a 19-20 year old with Data control experience (possibly banking/large company background) to work in Central London.

£4000

**NCR OPERATOR DAYS**

18 months' NCR experience required by small installation S.W. 1 Days only and 5 weeks' holiday.

£4500

**HONEYWELL OPERATOR**

1 yr. + OS 2000 experience required, some GCOS an added advantage, for C. London site upgrading shortly to a 64. 2 shifts only.

c£5000

**ICL 2800 OPERATOR**

18 months' 1800 or 2800 experience required by large W. London installation running 2800s. Good career prospects and excellent perks.

£5000

**Datascene Recruitment Ltd**  
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## MYRIAD

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CONSULTANT

C. LONDON

c. £11,000

Our client, a leading international organisation, wishes to appoint a telecommunications specialist who will define and direct current and future telecommunications strategy for their complex world-wide networks.

The position involves responsibility for managing the technical appraisal and evaluation of new voice, telex and data transmission services which are currently being developed. Particular emphasis will be placed upon an innovative approach to technical projects and making recommendations to senior management.

The position is ideal for a person offering a sound background in telecommunications technology and wishing to retain involvement at the forefront of development in this field. The person required will introduce a creative flair and ingenuity to the position and be capable of communicating effectively with all levels of management and maintaining a sensitive approach to organisation structure and responsibility.

This is a rare opportunity for someone to develop their career in such a role and is with an organisation accustomed to recognising and rewarding skills. A full range of company benefits are offered together with a generous relocation package where applicable.

Ref: NI/0702

## MYRIAD APPOINTMENTS LIMITED

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CANADA  
DATA PROCESSING  
PROFESSIONALS

opportunities in the province of ALBERTA

## DO YOU MEET OUR REQUIREMENTS?

If you have two or more years of systems and programming experience, we invite you to consider one of our challenging positions as an Intermediate or Senior Analyst, or Project Manager in our progressive organization located in Edmonton, Alberta.

## OUR ORGANIZATION

Alberta Government Services, Computing and Systems Division is the central Data Processing facility for the Alberta Government. Computing services include the operation and support of one of the largest computer centres in Western Canada. Systems services include all new development and maintenance activities associated with the challenging applications of our clients.

The Edmonton Data Centre consists of One IBM 3033 and two IBM 370-168's under MVS/JES2. Included is a network of more than 700 terminals throughout the province. Software includes COBOL, TSO, Mark IV, Librarian, CICS, TOTAL, Environ I, VTAM, and Roscoe.

## OUR OPPORTUNITIES

Our career positions offer successful candidates the opportunity of advancement and professional growth in a challenging and stimulating environment. Commencing salaries will be dependent upon experience, benefits include contributory pension, life insurance and medical schemes.

Relocation assistance includes air fare to Alberta for successful candidates and their families together with various settling-in allowances.

NOTE: In addition to the above positions, candidates will be considered for data processing positions in other Departments of the Alberta Government.

Please send resumes by February 22nd to:

W. M. Harvey  
Alberta Government Services  
c/o Manpower Mobility Office  
Government of Alberta  
47 Upper Grosvenor Street  
LONDON W1X 9PG

Opportunities  
for OperatorsALWAYS RELY ON KNIGHTS FOR  
THE BEST MOVES

Jane Mogg is here to give advice and keep you in touch with a variety of permanent opportunities. OR if you have a minimum of 2 1/2 years' operating experience and contracting is your business, then Jane Mogg, Rachel Merrin or Shari Poll can give you an up-to-date list of immediate contracts and details of those still in the pipeline 01-491 4706.

**SHIFT LEADER MIDDY**  
IBM 4331 to be installed mid-March. Excellent opportunity for DOS VS POWER VS op. Initially to work days, progressing to 2 shifts next year. Very good prospects.  
**SALARY: £5,500 + a/s neg.**

**TRAINEE EC2**  
Golden opportunity for smart, intelligent and enthusiastic young person. Company will train on mini computer. Hrs. 11 a.m. - 7 p.m.  
**SALARY: £4,800 neg**

**SENIOR OPERATOR EC1**  
Univac 90/30 installation using OS3. 2 shift system. Excellent company benefits. Very good prospects for the right person.  
**SALARY: £5,525 + neg**

**JUNIOR OPERATOR EC3**  
ICL2903/4 site operating 2 shift system. Good promotional opportunities with company perks making an attractive package.  
**SALARY: £4,800+**

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## Opportunities for Analysts &amp; Programmers

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Immediate + future contracts for COBOL or ASSEMBLER Programmers with CICS experience under OS. Please CONTACT NEIL WILLIAMS FOR DETAILS.

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To work in Kent and Holland  
**HOLLAND** - Ideal first-time contract. A minimum of 12 months' duration. Good OS or DC essential for development project.

**KENT** - Also very good first-time contract. Initial 3 months' duration. Easily commutable from Charing Cross. The above requirements are current and future, so if you are immediately available or on one month's notice, call Neil Williams or Colin Cherry on 01-491 4706 (daytime) or 01-408 0290 (evenings).

ICL CONTRACTS  
LEEDS, LONDON & THE SOUTH

First-class opportunities exist for contract staff with sound ICL 2900 experience. ANALYST/PROGRAMMERS + PROGRAMMERS experienced in COBOL VME/B and/or IDMS should contact Richard Kaluszynski or Denise Fleming now.

For further details of the above vacancies and other permanent opportunities phone Jane Mogg.

Knight

Knight Computer Services Ltd.,

14 Old Park Lane, London W1X 9PL

01-491 4706

## Sales Manager

Birmingham

to £10,000 + bonus + car

This outstanding opportunity has arisen following the establishment of a permanent, regional office by a fast expanding mini computer and software house. With proven equipment and recognised client contacts the new operation is destined to achieve exceptionally good results and the manager appointed must have the capacity to undertake the resultant responsibilities. At least two years' experience in selling mini-computers is essential and the ability to motivate and manage an aggressive sales team is also necessary. In addition to the high basic salary, high bonuses on team performance, an attractive personal commission and a two litre motor car, make this a most rewarding challenge. Reference 4/1198.CW.

## Sales Representatives

Birmingham based

£8,250 + commission + car

Dramatic expansion of our client's software and mini-computer sales activities in the Midlands area has resulted in the creation of this rewarding challenge. The company is established in other parts of the United Kingdom and the new Birmingham office will take over current enquiries and be in a strong position to maximise business levels with the help of excellent support facilities. A generous commission based on 2 1/2% to an annual quota of £150,000 and 5% thereafter, could double basic salary. If you feel that you are capable of selling mini-computer systems and have previous relevant experience then this is the opportunity you have been waiting for. Reference 4/1197. CW.

Please telephone 021-622 3838 at any time for an application form or send full career and personal details to John L. Overton, F.C.A., M.E.C.I., Overton Management Selection Limited, Monaco House, Bristol Street, Birmingham B5 7AS, quoting the appropriate reference number.

Applications are welcomed from men and women.

OVERTON MANAGEMENT SELECTION

Computing  
Opportunities

Saudi Arabia

c £14,000 Tax Free

An established company in Jeddah are sole agents for a major international motor manufacturer. To facilitate growth they have recently acquired a dual IBM 4331 installation and consequently seek the following key personnel:-

## Operations Supervisor

Experience with IBM DOS/VS, VSAM, POWER, DL1 and CICS systems. Duties - supervise operations and data control and assist systems programmer.

## Analyst/Programmers

Experience with IBM systems as above plus SYS. GEN. of DL1, CICS and COBOL. Duties - design, program, SYS. GEN. install vehicles distributor/dealer information systems.

A knowledge of Arabic would be useful.

Excellent fringe benefits include free family or unaccompanied passage, furnished accommodation, car, medical cover and generous paid home leave.

Please telephone B. Barker, 01-235 7030 ext. 324.

PER Overseas, 4-6 Grosvenor Place, London, S.W.1.



JBA

## OVERSEAS

Database Design  
in Benelux

Salaries neg. to £18,000 + Car + Benefits

Our client has established one of the foremost specialist Database/T.P. Consultancies in the U.K., and is set to do the same in Holland and Belgium. They already have an office in Amsterdam and are running several projects for Dutch clients at this moment. The plans are to expand this area by opening an office in Belgium, where the company already has one project about to get underway, and to continue penetration of the Dutch market. Applications are invited from candidates who have design experience of at least one of the CODASYL dbms systems - e.g. DMS 1100, TOTAL etc., who wish to enter the Consultancy field - if not already working for a Consultancy - and who are keen to live and work in one of the Benelux countries. Full relocation expenses will naturally be provided, plus substantial large company benefits such as company car etc. Relocation back to the U.K. in the medium term - to work for the U.K. based company - is not ruled out.

Contact: Andy Wright

## OEM Market Manager

Amsterdam

HN. 65,000 - HN. 75,000

A large international company, famous for a product range of high quality technical systems, are now seeking to expand and improve their penetration into the OEM marketplace. This position will involve marketing responsibility for the OEM customer base in a selected market segment. Candidates should have a demonstrated record of sales or marketing success in the computer/terminal industry and a good knowledge of display technologies. A background or education in electronics, initiative, and a business orientated attitude are essential. Reasonable amounts of travel in Europe will be required.

Contact: Mike Creamer

## Customer Support Engineers

Italy (Milan)

Nett: £8,000 - £10,000 plus complete relocation

Our client requires trained and experienced Support Engineers to assist in the preparation of complete installation, maintenance and repair documentation for an impressive range of mini-computer systems and associated data comms networks.

Candidates must be reasonably articulate and have a flair for communicating on technical subjects, particularly in the written word. Wonderful permanent job opportunity with excellent working conditions and career prospects.

Contact: Mike Creamer

## Level 64 Systems Programmer

North Holland

c. £18,500 (nett)

Long term assignment for an extremely experienced Honeywell Level 64 Systems Programmer, with team leading ability and problem solving skills. The work involves implementation of a whole RT system and comprises system optimisation, software diagnostic testing and ensuring thorough efficiency. An early start date is extremely important.

Contact: Mike Creamer

## X25 Implementation

S. Germany

Salaries to DM 90,000

A new communications group is to be established in Germany, by one of Europe's leading Consultancies. To date, the company has specialised in Database/T.P. projects and has scored major successes in the field of innovative and effective design.

If you have X25 or similar software experience, and would relish the challenge of developing a new European group...

Contact: Andy Wright

## Designers/Programmers

Middle East

£16,000 - £24,000

Applications are invited from qualified technical staff, who wish to work in the Middle East. Our client is one of the foremost Systems Consultancies in the U.K. which will provide long-term career progression within the company to Senior Management and Technical Consultancy levels.

Immediate assignments to the company's Middle Eastern branch are, however, available to suitable candidates. Tax-free salaries and benefits are on offer, plus free accommodation and a company car per employee. Ideal experience would be on large machines, with strong preference given to candidates with dbms design and/or programming experience.

Contact: Andy Wright

JAMES BAKER ASSOCIATES,  
International Personnel Consultants,  
32 Savile Row, London W1.  
Tel: 01-439 9311.

01-439 9311



**JBA**

## MORTGAGE SUBSIDY PLUS RE-LOCATION Senior Programmers

**Hampshire up to £7,500 + many benefits**  
Our Hampshire client, undertaking advanced development work on a large real-time database system, now need to strengthen their team on this project with additional senior staff. The system is being built around a powerful Burroughs B6800 machine and incorporates a DMS 2 database with a multi-terminal real-time network.  
Candidates must be mature, senior individuals with several years programming experience on real-time and/or database development projects. Leadership qualities and a natural ability to readily conform to strict standards will be sought.  
**Contact: Mike Creamer**

## Technical Applications

**Berkshire neg. to £9,500**  
This small but extremely well-known and highly regarded systems and software house, urgently requires technical applications specialists with in-depth experience of developing complex systems. Since unique software needs special creative skills, design and implementation experience at this level is also very important.  
In-house access is provided on variety of machines - INTEL 8080, F100L, PRIME 350, D.G. NOVA etc., indicating that the majority of development work is carried out at the company's H.Q.  
Occasional travel will be required, with opportunities to spend short periods in Europe. An up-market salary and benefits package is offered.  
**Contact: Margaret Stevens**

## Project Leaders

**Cheltenham c. £9,000**  
The company are market leaders in mini-computer-based technology for the printing industry worldwide. An in-house computer facility is now planned. This will provide a unique ground-floor opportunity for experienced DP professionals. Candidates will have a minimum of five years in computing, which should include substantial systems analysis experience. Financial, commercial or production control experience is essential - the emphasis is on applications knowledge rather than specific hardware or software background.  
Systems Analysis and a Chief Programmer are also required - first class benefits package includes relocation assistance where appropriate.  
**Contact: Bernard Kiernan**

## Operations Controller

**Bracknell neg. c. £8,000 +**  
An Operations Controller is required to control and co-ordinate the efficient running of a worldwide network of minis - covering the U.K., U.S.A. and Far East - supporting a highly successful British Air Freight Forwarding company's operations.  
Candidates must have mini-computer operations experience, coupled with the ability to program in BASIC or DATASHARE. Considerable liaison with the overseas sites can be expected, and the appointee can also look forward to some involvement in the systems work.  
Excellent opportunity, with good career prospects - including overseas travel - and large company benefits.  
**Contact: Andy Wright**

## PASCAL Programmer

**West of England c. £7,000**  
Our clients developing a number of commercial systems on microprocessors and has a vacancy for a PASCAL programmer with at least three years experience in data processing.  
Candidates must be keen and enthusiastic to work on micros and have spent the last year using PASCAL.  
Salary is negotiable according to experience.  
**Contact: Jim Baker**

## Analyst/Programmer

**Surrey c. £7,000**  
Our client, a large international organisation, has immediate vacancies for Analyst/Programmers to join the commercial development teams.  
Applicants should have at least three years ANS COBOL programming experience on IBM equipment and have had some involvement with systems design, preferably in accounting, general commercial or database applications.  
This is an exciting opportunity to work on new IBM hardware with above average fringe benefits.  
**Contact: Jim Baker**

## Junior Systems Programmers

**München c. DM 60,000 p.a.**  
Programmers with a background of IBM operating systems software maintenance and generation are required to be trained in new Operating System Software development techniques.  
The company is a major European manufacturer, with developments currently being carried out in virtually every area of software. Excellent opportunities - candidates need only have 12 months plus experience.  
**Contact: Andy Wright**

**JAMES BAKER ASSOCIATES,  
International Personnel Consultants,  
32 Savile Row, London W1.  
Tel: 01-439 9311.**

## Hardware Sales Consultant in Computer Aided Engineering Cambridge based

Colour Graphics, Memory Systems, Micro-Processors

Industrial interest in the application of computers and micro-processors in production control, instrumentation and computer aided engineering is growing rapidly. It is the task of CADCENTRE to help our clients make better use of their resources.

It is no exaggeration to say that a revolution is taking place in these fields - and you could help to shape it.

CADCENTRE is staffed by some of Europe's leading practitioners in the development of advanced engineering software and hardware systems.

The successful candidate will have a good knowledge of state-of-the-art hardware system technology including micro-processors. You should be able to demonstrate a successful career in selling hardware systems and products over a two to three year period plus contract negotiation experience.

You will be experienced in hardware

system development and have demonstrated a capability in assessing the work involved in building complex systems against customer specifications. A background in computer graphics or computer memory systems would also be of advantage.

Amongst other hardware products of CADCENTRE you will be selling the Advanced Graphics Display Terminal which handles complex colour images used in a variety of applications within industries such as aerospace, fashion industry, and video animation. You will work closely with our Profit Centre Managers to achieve revenue targets against product and system development sales.

The ability to write and present clearly argued proposals, often to very senior client management, is naturally essential. We would expect candidates to be in their early thirties.

The Centre, in pleasant rural surroundings on the outskirts of Cambridge, combines all the advantages of a small organisation with the benefits of a large company. Our competitive salary and benefits package includes mileage allowance and assistance with relocation where appropriate.

Please write with career details to Norman Sendland, Marketing Controller, Computer Aided Design Centre, Madingley Road, Cambridge CB3 0HB; quoting reference CW1612, or you can talk it over with the Hardware Manager, Fred Chiles, on Cambridge (0223) 63125.



**Computer Aided Design Centre**

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To join the leaders in confectionery and soft drinks at this crucial stage of strategic expansion and development, you should be able to play an important role in the area of industrial process control and data acquisition systems. With upwards of five years' industrial experience, you'll be qualified (degree/HNC minimum) in Electronic/Electrical Engineering or a related discipline and with some useful knowledge of micro-based control systems.

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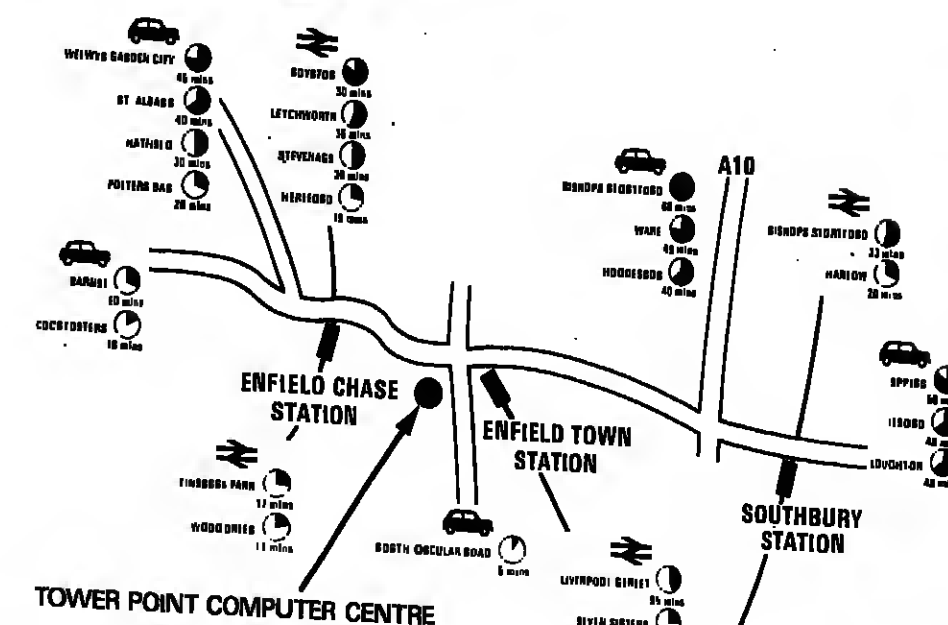
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**£7948-£9105**

Proven record of systems development and implementation plus some experience in a supervisory role, are the essential requirements for these positions.

Successful candidates will be assigned to one of 6 independently-operating Project Groups each of which are responsible for servicing the computing needs of a particular User Directorate.

The management of a Project Group would be the next career move available to Senior Analysts.

## TEAM LEADERS

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Programming Team Leaders are responsible for the control of all programming activities within a Project Group.

The duties of this position include recruitment, training, staff appraisal, quality control and programming of the more complex routines.

Typical team size is 6 programmers and applicants should therefore have some supervisory experience in addition to a solid technical background.

## PROGRAMMERS

**£5061-£7722**

One year's good COBOL experience (any machine) could qualify you for one of these superb career opportunities.

Working within a small-team environment, programmers will enjoy total systems involvement while gaining experience on the latest software products including VME/B, MAC on-line program development and Data Dictionary.

Additionally, there will be extensive opportunities to work on SCL, low-level languages and intelligent terminals.

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**£7316-£8405**

Systems Analysts will enjoy full feasibility-to-implementation responsibility for systems development within one of the 6 Project Groups whose particular areas of responsibility include finance, marketing, engineering, transport, supply and personnel.

Analysts will also have extensive contact with users throughout the East Anglia area and it is therefore essential that applicants should be self-motivating individuals capable of working under minimum supervision.

## SENIOR PROGRAMMERS £7316-£8405

Senior Programmers will generally control a small 2/3-strong programming team working on a particular system within a Project Group.

In addition to their supervisory duties, Senior Programmers will be heavily involved in the creative areas of detailed program design and suite testing.

This is a responsible and challenging role for which at least 3 years' solid COBOL programming experience is required.

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**£5142-£6878 (inc. shift allowance)**

An outstanding opportunity to gain experience within a multi-machine environment which includes ICL 2972, ICL 1900 and IBM 360 hardware.

Successful candidates will work on a 3-shift basis and will be considered for promotion to the position of Senior Operator (currently earning up to £7,500) once they become familiar with the work of the installation.

Previous experience of either ICL 1900 or large ICL 2900 machines is required for these positions.

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You will be joining a team of mini Programmer / Analysts set up to support and develop applications on all mini-computers in the House of Fraser organisation throughout the U.K. This means that in a short time you could be working on Data General, Radion, Vantak and System 10 equipment.

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- (i) Not less than 1 year's programming experience.
- (ii) An ability to communicate easily with both User and D.P. Management.
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**WE GIVE TO YOU**

- (i) Financial help in relocation.
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- (vi) The opportunity of:
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**Computer Services Sales**

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**c. £15,000 + Car + BUPA**

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Unique within the industry U.C.S.L. provides computer services based on a total range of capabilities; main-frame processing, R.J.E., time-sharing, on-site minis, network facilities and applications software development. Integrating and developing these services is one of the largest and most professional customer services groups existing in Europe.

Since 1975 U.C.S.L. has enjoyed a fivefold growth. To maintain this performance the company is now seeking to employ additional experienced computer industry sales professionals. These individuals must have the ability to develop existing accounts and

the energy and talent to generate and negotiate new business contracts at the highest level.

Successful applicants will have a thorough knowledge of computing facilities and an understanding of their application to a wide range of business requirements. They will be capable of working with and motivating high calibre technical support personnel.

The remuneration package offered is second to none with a high base salary, a generous commission scheme geared to realistic quota levels, free BUPA membership and a company car.

This is a real opportunity to join a company whose plans for success in the 1980s are based on a unique mixture of financial security, technological innovation and the continued adherence to a proven, successful business philosophy. For full information telephone Kevin McCourt or write with brief details quoting reference 3102. All applications will be acknowledged and treated in the strictest confidence.

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As a result of a successful year, we are faced with increasing demands for our products throughout the U.K. Backed by the progressive technology of the world renowned Philips Group, we market a range of office computer systems. We are currently one of the fastest growing companies in the Data Processing industry, and as a result of substantial upsurge in our Financial Terminal Systems sector, we have the following vacancies:

**SYSTEMS ANALYSTS**

(Benefits package includes car)

Philips Data Systems markets a comprehensive range of computers for business. A year ago the Division established the Sub-Systems software group. In order to market the Philips terminal systems products. During the course of the last year, the group acquired a number of major orders and in order to meet the requirements of our new clients, we are looking for Systems Analysts. Reporting to the Customer Support Manager, the successful applicants will be required to:

- \* Analyse and specify the requirements of customers' systems.
- \* Advise on systems performance where necessary.
- \* Design systems for the financial terminal systems range of equipment.
- \* Travel throughout the U.K. and Europe.

A minimum of two years' systems and programming experience, preferably with data communication knowledge, would be an advantage.

**PHILIPS**  
Simply years ahead

If you wish to know any more details, please telephone Colchester (0206) 5115, or write for an application form to: H. W. Hampton-Jones, Personnel Officer, Philips Data Systems, Binkley Road, Bergholt Road, Colchester, Essex.

**ANALYST/PROGRAMMERS**

We require Analyst / Programmers to work within our Sub-Systems group involved with financial terminal systems. The successful applicants will be involved with the control of project writing, and vetting of specification programming estimating and scheduling. This will also involve the applicants in analysing and designing small to medium systems. We are looking for candidates with at least three years' experience in programming.

**PROGRAMMERS**

We are looking for Programmers at all levels to support our financial terminal systems and other equipment. Applicants should have at least one year's computer / commercial experience, and the Company will train the successful applicants in the use of its wide product range.

Programmers will be involved with the writing and testing of programs for office computer systems, small business systems and financial terminal systems.

In all positions, which are open to male and female candidates, Philips offer you the opportunity to widen your experience in the challenging environment of an expanding computer marketing company. Philips provide extensive in-company training facilities and excellent prospects for career progression, over a wide range of products and in several software related activities. You will receive an excellent salary and conditions of employment, plus the security of working for part of the world-wide Philips Group. Generous relocation assistance will be given where necessary.





# Software Design

## Communications Development

## North West

Our client is a major manufacturer of a range of micro-processor based communications products. The creative aspects of these positions offer considerable opportunities to demonstrate flair and initiative.

### Software Designer

to £10,000 Basic

The successful candidate will join a project team involved in the concept, design, development and implementation of software systems. Graduates, aged 26 or over, must have 5 years relevant experience, some of this being gained in software design of data communications and should also have a knowledge of basic network principles. Ref: 310/CW.

### Systems Programmers to £7,500 Basic

### Trainee Programmers c. £4,500 Basic

Essential qualifications for this position are graduate status with 2/3 years programming experience covering ASSEMBLER or microcode. Experience in communications, whilst not being essential, would be a distinct advantage. Ref: 311/CW.

These positions will appeal to graduates with a relevant degree, ideally with 6 months work experience. Candidates must have the personality to succeed in a demanding, but exciting high technology environment. Ref: 312/CW.

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Much of our success in this operation lies in a highly efficient data communications network, which we're currently updating with the latest ICL computer system available - the new generation 2900 series. Apart from administrative and financial applications - new management accounting, billing/best recovery systems - we need to store vast amounts of data on rainfall, river flow, water quality and biology. Other applications include developing sophisticated models and reporting techniques to control daily operations and outline future plans.

Already we're augmenting our present system - 2 ICL 1904S machines using GEORGE 3 - by introducing a dual 2972 (6.m.b.) configuration, housed in a new purpose-built computer centre at our head office, near Werrington. Providing on-line processing facilities for each divisional office, it will have a back-up of 2903 remote processors and 7502 terminals and further mini computer link-ups to the main frame are being considered. As a result, this has created several exciting opportunities for experienced computer professionals to work in the following categories:-

#### 1) Application Development

For the following posts, several years' experience in the relevant field is required, together with a working knowledge of COBOL or FORTRAN.

POST A: PROGRAMMING TEAM LEADER

POST B: SENIOR PROGRAMMERS

POST C: SENIOR ANALYSTS

#### 2) Technical Support/Systems Software

You should have experience in at least two of the following fields:  
ICL 1900 series, ICL 2900 series, large operating systems, mini-computers or communications.

POST D: TECHNICAL SUPPORT TEAM LEADER

POST E: 2900 PROJECT OFFICER.

In each case you will, ideally, be young, intelligent, educated to degree level or equivalent and capable of working on your own initiative.

If so, we can offer excellent conditions of employment, including salary ranging from £5,421-£7,998 (depending on age and experience) and generous fringe benefits, including relocation expenses if necessary.

Interested?

Then take up the challenge of an exciting career with great future prospects. For further information ring 092 872 4321, extension 38, or write for an application form to:

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The above posts are open to men and women.



## THE CONVERSION OF NCR - A Real Success Story\*

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- +
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NCR needs Salespeople, to work in the London area. The range of products includes the 8200 through to the 8600 series of computers that is medium, large and very large mainframes and a wide range of terminals specific to different application areas.

Commercial and Industrial Systems opportunities exist for people with a business and computer systems background who wish to start a selling career. Higher level positions are available for people with sales experience and a proven selling record in the computer industry.

- Commercial and Industrial Systems
- Automotive Industry
- Production Control Systems
- Retail Systems

NCR also has vacancies for good systems people who wish to sell and for computer salespeople with a good record with specialist knowledge of the automotive industry.

With the success of the MISSION package, the Industrial Team is being expanded and NCR needs people with a good production control background.

In the Retail field NCR wants people with a strong retail background to sell from point of sale terminals through to large mainframes.

As we hear every day of doom and gloom it is encouraging to read a real success story. The change within a decade, of NCR from the sick man of the business equipment industry to a thriving dynamic company is vividly recounted in a recent article describing, "The Conversion of N.C.R."

### Consider these facts to place NCR in context -

TRADITIONALLY, the company marketed the first transistorised computer in the late 1950s, almost invented the art of professional selling, refined the use of training and played a major part in the application of mechanised information processing systems from cash registers and accounting machines to computers and terminals.

FINANCIALLY, NCR is one of the strongest companies in the EDP market. Profits and productivity have climbed dramatically in the past few years. R & D investment is growing and has already given birth to an enormous range of new equipment. The company forecasts a doubling of turnover by 1983.

PRODUCTS, both hardware and software are formidably competitive. Complete migration is possible from the smallest 8100 series computer to the largest, mammoth 8670, using the same software and files. In the traditional NCR strengths of retailing and the financial sector, a tremendous diversity of terminal systems such as point of sale and banking "through the wall" equipment is available with many systems already installed. In industrial systems, MISSION is an extremely accomplished production package which has revolutionised NCR's own production control. Automotive Industry systems are creating considerable impact in the E.E.C. If there is a speciality required then NCR often has the product - now.

PEOPLE, make the whole business success. The facilities are there, in new and traditional markets, with a range of hardware and software tools suited to the task.

\*"THE CONVERSION OF N.C.R." was published in Management Today, December 1979. A reprint of the article will be sent to all applicants - it provides background to the emergence of NCR to its present powerful position in the EDP market place.

Please telephone (24 hour answering service), write or return coupon to apply. Quote Ref: CW105-DJ

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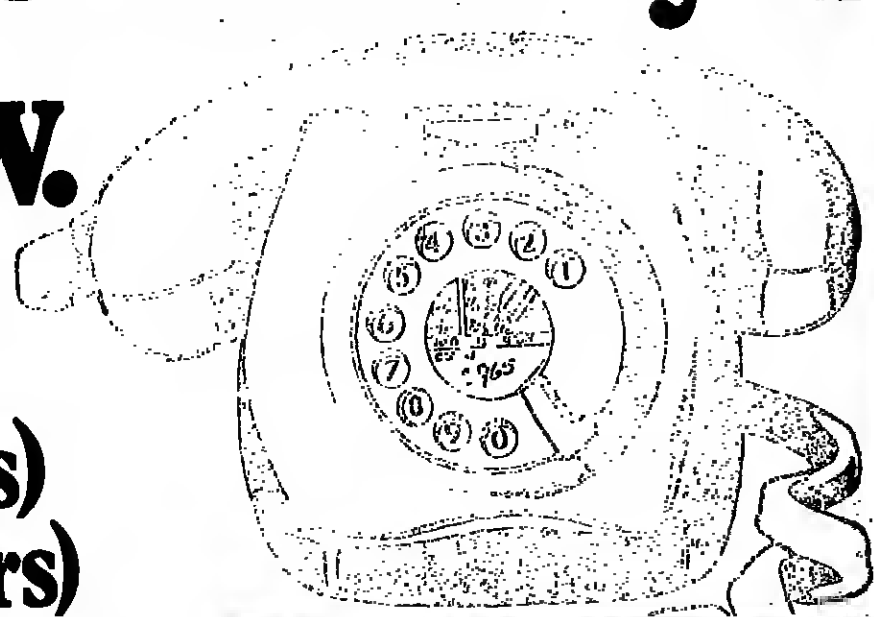


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## Programmers

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**£250 per week Midlands**  
Here's a unique opportunity to get into Micros. A commercial city based company want Realtime BASIC+ PROGRAMMERS like you to work on PDP11. The working conditions are nothing short of luxury and the immediate contract for 3 months is renewable.

**£250 per week Midlands**  
Have you got large 2900 and/or 1900 experience, ideally with GILL and VMEB knowledge? If so, then you've got what it takes for one of only 4 vacancies for our expanding client. You'll get an initial 4 month contract and a chance to start right away. Maximop experience advantageous.

SYSTEM 10 COBOL—Mids 12 mth **£260**  
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2903 COBOL North East 6 mth **£250**

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IBM 370 ASSEMBLER  
(TOTAL) NW 6 mth **£250**

Immediate hotel accommodation will be arranged for successful short term applicants

## The Knight Programming Security Deal

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## Analyst Programmers

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Our fast developing client wants your knowledge of ICL hardware and your experience as a Business Analyst or Systems Analyst and will pay big money. There's a friendly team for you to head and it's the perfect opportunity to join an expansive company at a top level. The contract is for 4 months so contact us now about when you can start.

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REAL TIME SYSTEMS DESIGNER  
PASCAL LONG TERM Mids **£260**

Phone our job line now for all the vacancies we've had in since going to press!



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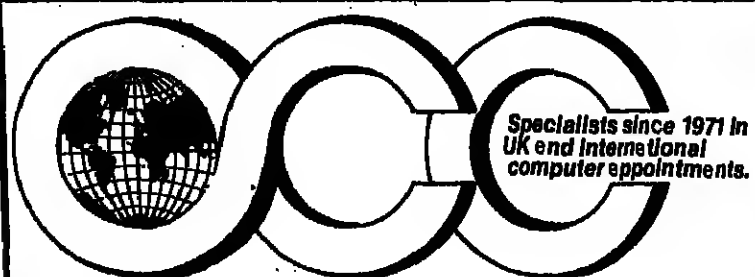
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We are staying open at our London office on the days and times shown above so that you can call in to discuss the employment opportunities that exist with our client.

Because we appreciate that taking an overseas contract can be a big step we would like to show and tell you about our client's organisation.

Our client will be interviewing in London on the 21-22 February and in April to recruit people for their organisation in Saudi Arabia.

#### THE PEOPLE REQUIRED

Systems Designers (Business Analysts) are needed for its Material Supply Section. Every year materials are handled with a value in excess of \$2 billion with movements of over 400 aircraft, 250 ships and 500 trucks, as well as 1.2 million square feet of warehouse space and 1000 acres of yard storage to control. Candidates should possess a degree or equivalent qualification and be experienced in developing major commercial systems. Hardware background is not important.

#### THE REWARDS

Contracts are on a single status basis and renewable. Air conditioned accommodation and free medical care are provided. In addition to an attractive base salary a bonus is paid on contract completion. Married personnel receive return leave every 4 months. Applications are invited from both men and women.

Telephone Mike Mead now, on 01-242 9356 (days) or 01-807 7425 (evenings) to find out more about these opportunities. Whilst it is not essential for you to come along to our informal interviews on February 14th and 15th, we would strongly urge you to take this opportunity to find out more about these exciting jobs.

If you are unable to come along or telephone, please write, quoting reference 912/CW, to  
London  
OCC Computer Personnel, 16 Bedford Row, London WC1R 4EB.  
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Informal Interviews  
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370 OS IMS COBOL Analyst/Programmers and Project Leader  
370 OS IMS PL1 Programmers  
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PDP11 RSTS/E BASIC+ Programmers  
PDP11 RSX11M MACRO 11/CORAL Programmers and Team Leaders  
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Counties and the South West of England

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370 OS IMS COBOL Programmers  
370 OS IMS PL1 Programmers  
370 DOS COBOL Programmers

#### OTHER REQUIREMENTS

PDP11 RSTS/E DIBOL Programmers (with systems exp.)  
PDP11 RTL2 Analyst/Programmers and Programmers  
DG RDOS Business Basic Programmers

If you are interested in any of these contracts, and have at least two years' experience as a programmer or analyst, we would like to hear from you.

Please provide information about contract assignments.

London ☐ South ☐  
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Mail (no stamp) to FREEPOST, VLI House, London, WC2N 4BR.

## COMPUTER OPPORTUNITIES IN SCOTLAND

'...so anyone with 12 months of experience, please come home'

by Philip Bliss

of DML Computer Personnel  
of Edinburgh

### SYSTEMS ANALYSTS, JUNIOR ANALYSTS PROGRAMMING PROJECT LEADERS PROGRAMMERS

For a leading Commercial organisation require D.P. professionals to join their expanding team at their headquarters in Central Scotland.

THE JOBS:

#### BUSINESS ANALYSTS

Senior: To aid the user departments in the solution of their business problems and also the necessary data processing software.  
Junior: At the senior level candidates should be educated to degree standard or equivalent, have at least three years' systems analysis experience and a general knowledge of commercial environment (e.g. O & M, Accountancy). A number of Junior Analyst posts are also available with the same educational requirements but with less experience.  
Salary: £8,800 to c. £7,900 + Benefits.

#### PROGRAMMING PROJECT LEADERS

Senior: To lead a team of programmers engaged in computer system design and system development.  
Junior: A practical knowledge of COBOL and ASSEMBLER, Systems Design and Project Control. An IBM mainframe background is essential.  
Salary: £7,500 + Benefits.

#### PROGRAMMERS

Senior: To be part of a team responsible for the writing and implementation of COBOL/ASSEMBLER programs.  
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### NORTH OF SCOTLAND HYDRO-ELECTRIC BOARD COMMERCIAL SYSTEMS DEVELOPMENT OFFICER (c. £11,000)

The North of Scotland Hydro-Electric Board require an experienced computer professional to lead an established but expanding department of 25 analysts and programmers.

Over 1,000 computers have recently been installed and currently process a wide range of applications converted from earlier equipment. New systems are being designed, greater integration is planned and personal facilities are being extended and developed. Database will be used.

The successful candidate will probably have a degree and/or professional qualification and around ten years' experience in computer systems. Proven ability in assessing work content and implementing major projects to agreed timescales is essential.

The Computer Centre is located in an attractive part of Aberdeen and where appropriate, assistance will be given with relocation expenses. A house to rent may be available for a limited period. Salary on a scale rising to £11,500 per annum and conditions are in accordance with the Electricity Industry NCC Agreement.

Applications, giving details of qualifications and career, should be sent to Computer Services Manager, North of Scotland Hydro-Electric Board, 100 George Road West, Aberdeen AB9 2NY. Telephone 0224 22411.

AS in most other regions, demand for staff in Scotland still far exceeds supply, although there has been a marked improvement in the availability of training and experienced staff.

The increase in the number of trainees has been improved primarily because of the increased availability of related degree courses, the advent of government retraining schemes and a new awareness by the user that future analysts and programmers can be found from disciplines other than maths or computing.

It seems that the supply of experienced staff in Scotland has exploded recently. Many expatriates who have gained their experience "abroad" are more than keen to give their expertise back to the Scottish user in a senior capacity and in some cases this relocating of experience is a great asset. Not forgetting of course that there still remains keen competition from the local groupings of experienced staff in Scotland.

In fact the cry of the Scottish user looking for staff at present must be, "We have the experience, we have the benefits (yes, you guessed), we even have the technology, so anyone with 12 months' experience, please come home, or try life in Scotland."

Humour aside there is a real opportunity for the recently skilled analyst or programmer to move to Scotland and gain invaluable experience. The candidate can choose from the big IBM mainframe installation with a heavy emphasis on commercial applications, the large manufacturing concern with production control systems, or one of the many other components of the efficient DP-oriented industrial combine.

For the technically minded Scotland is a real haven. Numerous computer and peripheral manufacturers have plants in Scotland and there is a constant demand for quality staff at all levels. Within the large installations, with the advent of new machines and more advanced software, the demand for technical staff has been increased.

The openings exist for the candidate with one to four years' experience, so why should you move over the border? No doubt most readers of Computer Weekly pages in Scotland will read of the increased quality of life in Scotland and there is a real increase in the numbers of computer staff discovering the reality of such statements.

However, in an article on working and living in Scotland, I have once more to extend the benefits of life here, namely even those living south of the border know of the beauty of the

Scottish countryside. Skilling in winter, golf for all, rock climbing for the brave, water sports for the aquatic, and last but not least real Scottish water to add to your large whisky in a friendly local hostelry.

Friendliness is an important feature of the Scot and it may come as a pleasant social bonus to those who live in the anonymous, anti-social surroundings of the big city.

Enough of the good life and down to the day-to-day economics of life up here. Housing is not cheap, but it is reasonable, and generally you can live in the city and nearer your work at a reasonable cost and certainly for a lot less than you can in the South of England.

If you live in the city commuting times and costs can normally be reduced substantially. Most companies take the financial sting out of the move North by giving relocation expenses and if you have good commercial experience you might be lucky enough to get placed with a banking, finance or insurance organisation which offers preferential personal loans and/or mortgage subsidies.

So how do you discover what is happening in Scotland? Many agencies have dealings in Scotland and this may be a reason why a great number of vacancies remain unadvertised nationally. Without appearing too biased the best initial move is to talk to those agencies "on the ground".

This is common sense.

Scottish industry and commerce are conservative in their development of business relations and the level of trust remains stronger at a local level, because generally it means a greater understanding of the staffing problems.

Take time to choose an agency which can do more than reel off a list of jobs and offer to pass your details around. You will be moving not to a foreign country but to a different

one nonetheless, therefore a preliminary interview is essential to find your bearings and discover not just the right job but the right locality and company.

If I may quote a competitor of mine from the recruitment community, "Nobody can afford to ensure these days." This applies as much to the prospective employer as to the potential candidate.

Nobody wants to travel to Scotland half a dozen times to find the job to suit them. Candidates should make sure they use their agency to the full and should have trust in the ability of the consultant handling them. The client should also have more than just a few details on a bit of paper before spending substantial sums on interview expenses.

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Various engineering and commercial applications are under development, many of which may utilise CICS and/or VSAM.

Our Development Section require additional programming staff, preferably educated to 'A' level standard, with a minimum of 2 years COBOL experience, ideally in a DOS/VS environment similar to the above.

Additional experience in structured programming and tape processing techniques would be advantageous, although training will be provided if required.

Successful applicants would initially join our Development Team as Programmers, but would be encouraged to develop analytical skills and to accept additional responsibilities within the team. A competitive salary is offered and other staff benefits such as Pension Schemes, Sick Scheme and a Recognition Plan are indicative of the importance placed on these positions. A generous and well thought out relocation package is available.

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John Kelly



## COMPUTER OPPORTUNITIES IN SCOTLAND

Graphics Software

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Computer Graphics is becoming the most important opportunity area for applications oriented software designers. Here in the UK we have some of the best designers in the world, but, because of the fragmented nature of the UK computer graphics activity, many of these designers are frustrated by lack of opportunity to move ahead.

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# It's all systems go at Hambro Life!

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For more information contact Jack Collings at his office from 9 a.m.-5 p.m. on 0273-833848, or if you prefer, speak to him any evening (including weekends) at home after 7 p.m. on 0273-400880. Failing that, just simply send in your career resume and we will get back to you.

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John 12/20



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The work is challenging, the environment stimulating and the salaries and benefits highly competitive. Training will be given as necessary.

There are excellent future career prospects within the Company at both the Borehamwood, and Welwyn Garden City sites which is expanding fast.

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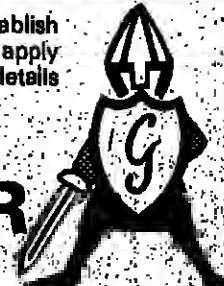
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## ENGINEERING BIT

When the term "engineer" is applied to the computer field, it covers several areas and disciplines, and in the coming weeks David Casey will be looking at the varied roles played by the computer engineer. Readers who have comments on the topics dealt with or on original subjects should write to David Casey c/o Computer Weekly, Dorset House, Stamford Street, London SE1 9LU.

## Inadequate rewards

THERE are lies, damned lies and statistics. When the figures in question are being used to prove conclusively that the engineer is grossly under-rewarded, then we are talking about irrefutable statistics.

In the seventh Survey of Professional Engineers, recently published by the Council of Engineering Institutions, results collated from more than 25,000 questionnaires provide the evidence that conditions for the engineer have fallen steadily below par. While the conclusions drawn in the report can do little to encourage new entrants right now, it is the long-term trend in the statistics which should cause concern.

The first survey by the Council was conducted as far back as 1966, at a time when the new role revised status of the professional engineer was crystallising, and British industry was being fired with enthusiasm by the Ministry of Technology. Salaries rose progressively in real terms through in the 1974/5 study, when the pattern reversed. In terms of the purchasing power of their income, the top 10% of the profession are now earning almost £150 less than they were 15 years ago.

It is only among more recently qualified engineers that there has been an advancement in salary levels since the first survey — but even here, there has been a fall in incomes from the peak of five years ago.

The disparity between engineering and other professions is accentuated when we compare the income indexes for chartered engineers and real average earnings across the UK. The engineer has advanced only 9% in real terms, compared with a national increase of 34% during the same 15-year period.

With repressive income tax levels distorting salary levels in the UK, it might be expected that the engineer would be rewarded with a total remuneration package that offered alternative forms of compensation. If the provision of fringe benefits is any indication, however, employers have little regard for their most valuable assets. Company cars are the exception rather than the rule, with only a fifth of all the respondents qualifying for this somewhat dubious perk. Pension legislation, in recent years, has seen the number of engineers in company-based schemes rise sharply between 1977 and 1979, so that only one in ten is not covered. Directly by the employer's plan — but the movement can hardly be regarded as "attractive" gratitude on the part of the employer.

With 18 chartered institutions supplying the statistics, it is inevitable that direct comparisons will be drawn between them. It does not follow that the electronics engineer, so much in demand from within the computer industry, is top of the salary league.

Indeed, members of the Institute of Electrical and Radio Engineers fared particularly badly, their median income lying twelfth out of the 18, ahead of the production engineers, the civils, structuralists, and metallurgists.

Their "heavier" counterparts in the Institution of Electrical Engineers were treated little better, only one place higher in the table. League champions are the mining engineers, with a median income 20% higher than the electronics profession, at £8,550.

Not all the downward trends indicated by the survey are unwelcome: unemployment among professional engineers of all disciplines has fallen since this factor was first studied in 1971. Typical levels are less than half of one per cent, with only the machine tool industry causing any real concern at 0.8%. For those chartered engineers unable to secure work, 60% were "resting" for less than three months.

One effect of setting up the Council of Engineering Institutions in 1965 was to co-ordinate entrance requirements to the profession, ensuring a uniform standard irrespective of the sector. The graduate engineer became the norm, with an alternative entrance through the Council's Part 2 examinations. By the 1979 Survey, graduates accounted for 80% of all chartered engineers: of these almost a quarter hold a postgraduate qualification of some description. Apart from securing a solid intellectual base for the profession, this trend will go a long way towards establishing parity between British engineers and those in the EEC.

When the pattern of mobility within the UK is analysed, the engineer appears remarkably stable. Those between 25 and 30 appear most willing to move their job, only half having opted to take this step during the past six years. By the time that he approaches retirement, the professional engineer is quite happy to stay in the same company, fewer than one in ten have moved from one area to another to change employers during the past six years.

One comment from a professional engineer to the status of the professional, of whatever discipline, is responsibility. After all, there has to be someone to blame for the bridge which collapses, or the chemical plant that explodes. The experience which supports a true responsibility carried only a national program, a model of 1980 covers the whole of the "experience" spectrum.

David Casey



## A black and white illustration of a suspension bridge. On the left, a large, multi-arched stone tower stands prominently. A suspension cable runs from the top of this tower to a smaller, similar tower on the right. The bridge deck is supported by vertical hangers. The bridge spans a deep valley. In the background, there are rolling hills, trees, and a small building. The style is a simple line drawing with some cross-hatching for shading.

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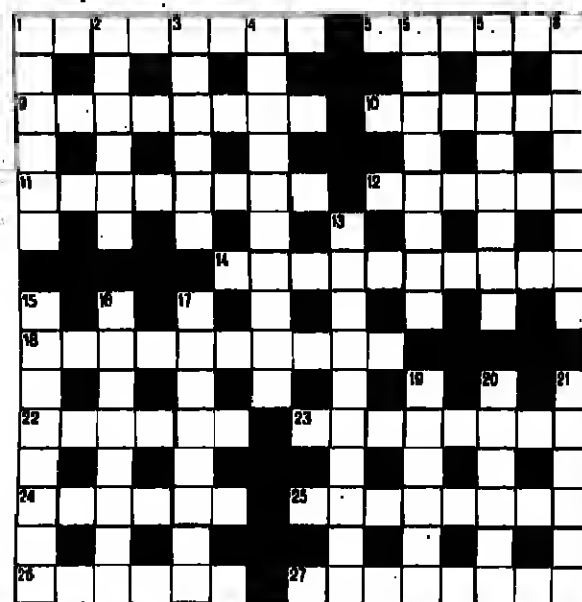


**NORCROSS**

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A PRIZE OF £10 will be awarded for the first correct entry opened. The second and third correct solutions opened will receive £5 each. Entries to Crossword Competition, Computer Weekly, Dorset House, Stamford Street, London SE1 9LU, by first post Friday, February 16. Please use a ballpoint pen to complete the crossword.



Name ..... (Miss, Mrs, Ms, Mr)  
Address .....  
Telephone .....  
I accept the rules and conditions of the Computer Weekly Crossword Competition.  
Signed ..... Date .....

- ACROSS**
- A fall can impair one's vision (8)
  - Statement of grievance lodged in the factory (8)
  - It's insensitive to fog a down-and-out (4-4)
  - The mongrel dog rejected no edible meat (6)
  - Being a blunder, I'm just what's needed, lying in the heather (8)
  - Impetuously attack a diplomatic agent (6)
  - Industrial action at the ground makes a success of a boring job (7,3)
  - Completely sane, hoarding silver - It's the current fashion (3,3,4)
  - Sticky, reticent person - dear me! (6)
  - Breaking truce arranged with RAF (8)
  - I'm frozen here in Paris - muscle's half gone (6)
  - One who's devoted to pleasure has done this badly (8)
  - When engaged in endless voracity, you get fed (6)
  - Maintain quiet aloofness (8)
- DOWN**
- It's diving tucking into cabbage - holl lightly (8)
  - Half of us jammed in old transport, receiving a psychological shock (8)
  - Disenchant has to be given up in tax (8)
  - One of a series of shops offering tea this month, and mince (8-8)
  - Sound of amusement makes hatcher lose head (8)
  - Come not broadcast in the local radio network? (8)
  - Gaudy in the South, featured in TV (8)
  - Drink to stimulate a drone, perhaps? Right (6-4)
  - Demonstrating, maybe, the curved feature in antique type of pottery (8)
  - Run off, clutching a coin, for a trifle (4-4)
  - Walks awkwardly, creating a mess (8)
  - A cause of vexation? That's what this clue certainly isn't! (8)
  - More fussy American put into test carriage (8)
  - Feel irritated about non-alcoholic condition (8)

**Rules and Conditions**

- Each competitor may submit no more than one entry.
- The competition is open to all readers of Computer Weekly with the exception of the staff of IPC Business Press Ltd, any printers employed by them or the near relatives of any such staff.
- The solution of each puzzle will normally be published in the issue three weeks after the puzzle has been published.
- Winners will receive their prizes during the month following the competition.
- The decision of the editor on the interpretation of the rules and conditions and on all matters relating to the competition shall be final. No correspondence will be entered into.

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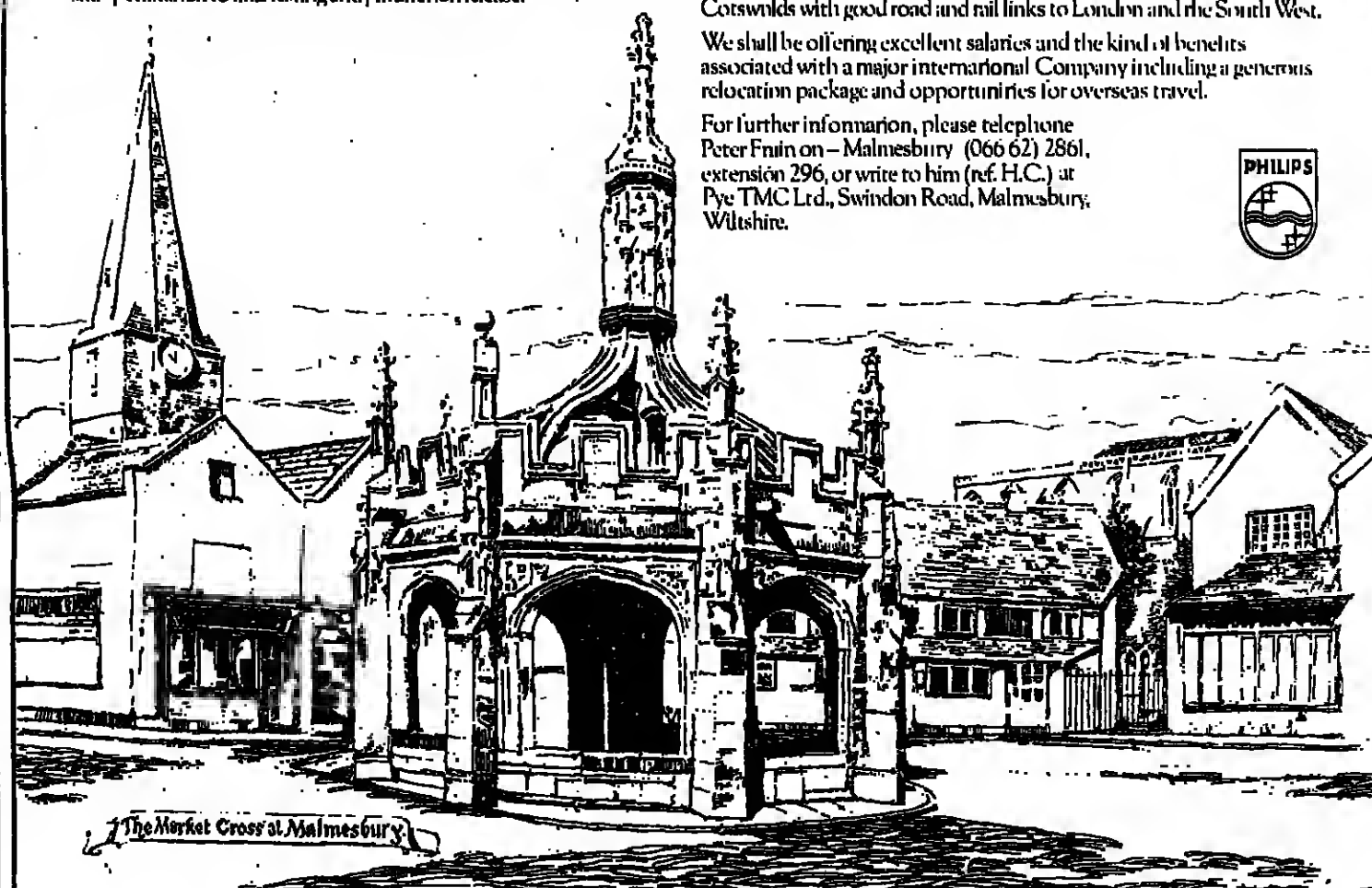
- Trainee Programmers.
- Recent Graduates in computer science or a course with a major computer content.
- Programmers with one or two years' experience in assembler and a high level scientific language.
- Systems Programmers with two or more years programming or design experience in real-time/control systems or operating systems.

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For further information, please telephone Peter Frain on - Malmesbury (066 62) 2861, extension 296, or write to him (ref. H.C.) at Tye TMC Ltd, Swindon Road, Malmesbury, Wiltshire.



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